

# The Commercial Car Journal

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## S. A. E. SUMMER TRIP JUNE 12th to 16th

The annual summer session of the Society of Automobile Engineers will again be held on the Great Lakes on the Steamer Noronic. The meet will start on Monday, June 12th, and end Friday evening, June 16th. Accommodations for over five hundred members will be provided and there will be the usual professional sessions, Standards Committees' work, and, in addition, a trip through Lake Huron and Georgian Bay.

The office of the Recorder and the Standards Committee has been moved from Detroit to New York, where it will be located in the general offices of the society, 29 West Thirty-ninth Street.

## TRUCKS FOR PREPAREDNESS OF THE MILITIA

Major General O'Ryan, of the New York National Guard, is perfecting plans for the organization of a motor truck transport corps, which will add greatly to the preparedness of the militia. He has granted Lieutenant J. W. O'Mahoney, of the Ninth Company of Coast Defense Service, permission to hold high-grade motion picture exhibitions in the armories throughout the city, the proceeds of which will go toward equipping motor companies. It is planned to have four companies, each consisting of twenty-eight trucks, a commanding officer, a motor truck master, two assistants, chauffeur sergeants, a cook, and as many privates as are necessary. Only men enlisted in the National Guard will be permitted to join this branch of the service. Owners of cars who employ Guard chauffeurs will be permitted to have their machines repaired at the National Guard garages free. In this way the Chauffeur Militiamen will be enabled to get practical experience in addition to that which they will gain at the school for guardsmen mechanics, which will be established as part of the scheme. State licenses will be granted to those who are graduated from this school. It is thought that two of the companies will be established in New York, one in Albany and probably one in Buffalo.

## VIM DEALERS TENDERED DINNER

New England Vim dealers were given a dinner by the factory on Wednesday evening, March 8th, during the Boston Show. This dinner was held at the Hotel Westminster, and thirty-six were in attendance. W. L. Light, general sales manager of the Vim Motor Truck Co., gave a very interesting talk on the Vim Co., and how to put more Vim into the business.

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## LOCOMOBILE COMPANY NAMES TRUCK AFTER ENGINEER

From Bridgeport, Conn., comes the news that the Locomobile Company of America is bringing out the latest edition of its worm-drive motor truck, named after its vice-president and chief engineer, Andrew Lawrence Riker. The new Riker truck is substantially the same product that the Locomobile Company has been producing for nearly two years, only that in it are incorporated a few refinements which, in the opinion of the company, practically standardize the product.

The name was changed from "Locomobile" to "Riker," for several reasons. In the first place, the name "Locomobile" has come to mean an expensive motor car, made in limited numbers.

Thus the name "Locomobile" on a Motor Truck would imply high cost, whereas the motor truck is a business vehicle, and it has to make good money on a money basis.

The company feels it desirable to separate the two branches of its business sharply and the change in name accomplishes this.

## MOTOR TRUCK CLUB HEARS SPEECHES ON PREPAREDNESS

The Motor Truck Club of America at its regular monthly meeting on February 16th at the Automobile Club, New York City, took steps to formulate plans for national defence. The speakers of the evening were: S. Stanwood Menken, president of the National Security League; Major Allan L. Reagan, instructor general; Captain T. H. Shanton, Quartermaster Corps; Captain Kenneth Gardner, Seventh Infantry, N. G., N. Y., and George H. Pride of the Heavy Hauling Co. They discussed what has been done in Europe by reason of the preparedness which France and Germany had made long before the war was started, to have their motor vehicles listed and organized ready for quick mobilization. It was pointed out that this country has three times as many passenger cars than all Europe together and ten thousand more motor trucks than the combined forces of Europe. A committee to develop the resources of the club in trucks and men was appointed, comprised of Mr. Pride, Roderick Stephens and Arthur J. Slade.

## HIGHER COURT DECLARES KARDO COMPANY LEGAL

The Kardo patent litigation, which was apparently closed last April by the United States District Court in Cleveland declaring the same illegal, has been reversed in a recent decision by the United States Circuit Court of Appeals for the Sixth Circuit. This Court lauds the purposes of the Kardo Co., and declares that the same was legally formed, acted in good faith, and is entirely capable of suing and being sued in a court of law. The importance of the present decision is that it restores legal life to the Kardo Co., enabling it to act to protect the patents it owns. It was originally formed by the American Ball Bearing Co., the Packard Motor Car Co., and the Peerless Motor Car Co. to assume ownership of separate patents on equipment for the rear axles of automobiles. These patents overlapped to such an extent as to present hopeless complications in affecting licensing arrangements. By combining the ownership into one company these complications were straightened out.

**Truck Owners' Exchange**, Los Angeles, Cal., has been organized by owners of heavy duty trucks, the object of which is to bring owners, dealers and contractors closer together. It will be operated along the lines of any retail dealers association, and is to join the Merchants' and Manufacturers' Association. There are nearly \$1,000,000 worth of dump trucks in and around Los Angeles, and this organization will play a prominent part in the truck industry.

## Commercial Car Production Estimate for 1916

Figures Show That a Tremendous Boom is in Evidence

We give herewith a table showing the estimated production of gasoline commercial cars for the year 1916, and also for the 4 years from 1912, for purposes of comparison.

In our October, 1914, issue we gave an estimate for the production of 1915, but the actual production for that year greatly exceeded the estimate. This is accounted for by the fact that business generally was very much improved during the latter part of 1915, and the war orders for motor trucks were not included in the estimate.

The figures for 1916 show a tremendous increase, and we believe that they will be realized, even though the price of gasoline continues to advance, for business generally is enjoying an unprecedented boom and all business men now accept without question the commercial motor car as the best and most efficient method of hauling and delivery.

The most noticeable changes during the past year as disclosed by the estimate are as follows:

The decrease in the number of makers of the lightest delivery cars. This is accounted for by the fact that many cycle car makers had proposed to make light delivery cars, and when the cycle car bubble burst, these makers were eliminated. The number of cars being built in this class, however, shows a healthy increase, as does that of the 1000-lb. delivery, while the 1500-lb. delivery does not show any increase.

The most notable increases, however, are shown in the 1½-, 2- and 3½-ton sizes, the latter size particularly seems to have suddenly come to the front, the number of makers increasing from 15 in 1915 to 41 this year, and the product from 1920 to 3823.

We are unable to give any figures on electric commercial car production, as the manufacturers of these cars will not furnish any information; the figures for last year showed a production of about 7000 electric commercial cars, if we give them credit for a 10 per cent. increase during the year, making 7700 for 1916, the total production of commercial cars exceeds 100,000 for the year 1916.

Gasoline .....	92,469
Electric .....	7700
Total .....	100,169

### Production of Gasoline Commercial Cars for Five Years

CARRYING CAPACITY	1912		1913		1914		1915		1916	
	Makers	Trucks	Makers	Trucks	Makers	Trucks	Makers	Trucks	Makers	Trucks
500 to 800 lbs.....	20	4,506	16	7,492	22	330	31	1,629	11	6,450
1½ Ton or 1,000 lbs.....	34	4,592	31	10,928	29	9,444	32	13,545	32	18,815
2 Ton or 1,500 lbs.....	59	4,685	46	9,568	39	6,820	38	7,975	43	7,950
3 Ton or 2,000 lbs.....	66	5,098	62	7,770	72	8,904	68	10,458	70	13,785
1½ Ton or 3,000 lbs.....	39	3,115	46	7,695	63	5,536	59	6,387	68	11,072
2 Ton or 4,000 lbs.....	56	3,168	57	5,135	73	5,039	71	11,615	90	14,512
2½ Ton or 5,000 lbs.....	5	425	4	60	9	210	11	375	20	1,450
3 Ton or 6,000 lbs.....	58	4,865	52	5,675	52	3,887	48	6,884	40	7,017
3½ Ton or 7,000 lbs.....	8	276	13	864	18	945	15	1,920	41	3,823
4 Ton or 8,000 lbs.....	15	1,072	15	1,116	25	845	24	960	18	1,800
5 Ton or 10,000 lbs.....	44	2,212	43	2,604	47	1,581	44	2,995	39	5,089
6 Ton and over.....	12	687	12	765	16	502	18	545	20	706
Total.....	256	34,701	214	59,672	210	44,043	245	65,288	212	92,469

The total for the 5 years compared with 5 years of pleasure car production from 1904 to 1908 shows an almost equal progress in output of commercial cars with that of pleasure cars in the early years, and had it not been for the slump of 1914, the advance would have easily been as great as in the pleasure car line.

Pleasure car and commercial car production compared:

Pleasure Cars	Commercial Cars
1904.....	22,830
1905.....	38,000
1906.....	70,000
1907.....	90,000
1908.....	110,000
1912.....	40,500
1913.....	67,000
1914.....	50,288
1915.....	72,183
1916.....	100,169

### FEDERAL TRUCK BRANCH PURCHASED BY NEW YORK CITY CLUBMEN

The Federal truck branch in New York City, which has been on sale for some time, has just been sold by the parent company in Detroit to a number of prominent New York City clubmen, most of them millionaires, in the persons of Cornelius Vanderbilt, James B. Ford, Henry Whiton, Edwin Palmer and Martin W. Smith. A corporation will be formed which will begin work the marketing of the Federal truck in the Metropolitan section on an elaborate scale. The present quarters of the Federal Motor Truck Co., at 146 West Fifty-second Street, will be continued for about a year, or until the new corporation can build sales and service station.

The Philadelphia Evening Telegraph has purchased twenty-eight Garford trucks—twenty-four 1½ ton and four 1 tonners. This is thought to be the largest single order for motor trucks ever placed by any newspaper in the country.

The truck owners and drivers of Mohave County, Ariz., have organized with an idea of preventing rate cutting and other unprofitable competition. Over one hundred trucks are now running between Kingman and Oatman, the new boom gold mining camp 26 miles distant.

The International Motor Co. reports its total February sales of trucks, including export orders, are the largest ever recorded in a single month, and show a gain of 600 per cent. over February, 1915. Domestic business alone increased 25 per cent. over January sales.

### STANDARD WELDING COMPANY ENJOINED BY PERLMAN

The latest developments in the Perlman demountable rim fight took the form of an injunction served on L. D. Rockwell, Eastern representative of the Standard Welding Co. on March 8th, thereby completely stopping the manufacture, sale and delivery of demountable rims on the part of that company. According to affidavits filed by Perlman, Frederick P. Fish has offered, on behalf of the defendant company and the car makers, composing the National Automobile Chamber of Commerce, a royalty of \$.05 per set of five rims for all past infringements and those now contracted for, and \$.50 for all rims to be manufactured thereafter. Perlman insisted on a royalty of \$1 per set for all rims made between February 4, 1913, and the date of the recent decision of the United States District Court in his favor, and \$1.50 per set of five rims during the balance of the life of the patent. After a number of conferences, the defendant company considered Perlman's proposal to accept royalties of \$1.50 per set for all rims contracted for as unjust, oppressive and beyond commercial possibility. During negotiations which have taken place since the decision of the Court of Appeals, issued on February 4th, Perlman intimated that if the Standard Welding Co. should decide to drop the manufacture of demountable rims under the royalty terms which he proposed, he would immediately take steps to supply such car makers as may desire to equip their cars with demountables.

Work at the Standard Welding Co.'s plant was stopped on Wednesday, March 8th, and all shipments automatically held up. Unless compromises can be effected on short order between the interests involved, car makers and the automobile industry will be face to face with a condition which may become more serious than either the traffic situation or the shortage of material.

### LOCUST STREET, ST. LOUIS, FOR FAST-MOVING VEHICLES ONLY

The Board of Aldermen of the city of St. Louis are discussing the advisability of making Locust Street, between Twelfth and Theresa Avenue, available only to fast-moving vehicles, in the same manner as was done in that city on the one-way streets in the downtown district. The speed above which it is considered is a fast-moving vehicle is not stated. However, this means that very heavy wagons, horse-drawn, certainly will not come in the fast-moving class, while those of the same weight and tonnage, carried by motor trucks, will come in the fast-moving class.

Although there is no intention on the part of the Board of Trade to make legislation against one class of vehicle, the inherent defect of horse-drawn vehicles and the inherent advantages of trucks will make a distinction, excluding the first and permitting the latter in these three squares, the speed is the means for admitting them.

The Highway Commissioner of Harrisburg, Pa., has advised the purchase of a motor truck, a motor sprinkler and 2 motor sweepers.



# The High Price of Gasoline and the Automobile Fuel Situation\*

A Review and Forecast, With Some Information as to the Use of Low-Grade Fuels, and a Suggestion to the Automobile Industry and the Society of Automobile Engineers

By E. S. FOLJAMBE, Member of the Society



**I**NTRODUCTORY remarks as to the seriousness of the present fuel situation are unnecessary. The conditions are apparent to all. At the time of this writing, gasoline is selling retail for \$.05 higher than it has ever before sold in its history as an automobile fuel. The automobile industry is being seriously affected. A canvass of the garages in certain of the large cities resulted in establishing the astonishing fact that from 30 to 50 per cent. of the pleasure cars are standing idle in the garages. This, of course, is partly due to the season of the year, but is in great measure a result of the unprecedented price of gasoline. A general view of the situation leads the writer to believe that gasoline will go much higher before it again drops. That it will again drop is probable, but not to the point to which automobilists are accustomed. There is every indication that the price will continue to rise during the war and may even reach a prohibitive point, if legislation, greatly increased production and the use of lower grade fuels do not become actualities.

The causes underlying this phenomenal increase in price, the possible remedies or immediate methods of relief and those which may be considered as more permanent cures or future preventives, are the subjects of this paper.

## Effect Upon the Industry

That a price of \$.30 to \$.50 a gallon for gasoline will seriously affect the automobile industry is not questioned. Indeed, it is already seriously affecting the sale of cars. With commercial cars, the cost of fuel is even a more serious item, and the present price is making itself felt very appreciably in the total cost of delivery. Many merchants who have been converted to the advantages of motor-driven vehicles are now questioning the advisability of purchasing until the fuel situation is settled.

It is time that the automobile industry, not only the manufacturers, but the dealers, the garagemen, the clubs and the individual owners investigate this matter most seriously with a view to changing present conditions, either by new designs or legislation or both, if such seems within their power.

The Society of Automobile Engineers, the representative engineering body of this great industry, must shoulder its share of the responsibility and help solve the problem of carburetion of low-grade fuels. This is a question that cannot be ignored, it may be postponed, but must eventually be met, grappled with and conquered, and now ranks in importance to the industry with standardization.

\*Paper read before the Metropolitan Section of the S. A. E.

## Brief Review of Oil Production

First, let us briefly review the conditions in the oil industry leading up to the present fuel situation. Let us also pass over the first test wells in 1859, which were sunk in Pennsylvania and the subsequent use of the crude as a medicine and its use as an illuminant in crude lamps, the oil being used without refining, to the time when it was discovered that by distillation the products could be separated into products of high and lower grade of more or less volatility. This distillation led to better illuminating products, but the more volatile liquids were a drug on the market and for years were turned into the streams until this became a menace to the communities in which the early refineries were located. Records of the crude oil show that in 1859 it sold for \$20 per barrel of 42 gals., this being the usual sized unit. The prices fluctuated between this figure and \$3 per barrel up to 1874. Between that year and 1914, the maximum price reached was \$4.23, and the minimum \$.49. Between 1895 and 1914, the highest price was \$2.60 and the lowest price \$.60. During this period, the price of crude oil showed a steady increase, in spite of temporary fluctuations. New uses were continually being found for the various products of crude oil and the demand apparently kept slightly ahead of the supply, resulting in a steady and healthy increase.

## Actual Production Not Known

In any study of the crude oil situation, the peculiar fact is at once apparent that the actual production of oil at the wells is unknown, even to the Government. So-called production is, in reality, marketed production, there being no authentic records from month to month or year to year as to the amount of oil in storage. The word production, therefore, as used in this paper, refers to marketed production only.

## The Oil Fields

The Government divides the oil producing sections of the country into ten fields, as follows:

The Appalachian Field, including all areas of oil production in southwestern New York, western Pennsylvania, southeastern Ohio, western West Virginia, Kentucky, and Tennessee.

The Lima-Indiana Field, embracing all areas of oil production in northwestern Ohio and eastern Indiana, as well as a few scattered pools of limited extent in the western part of the latter State.

The Illinois Field, including the principal oil-producing area in the southeastern part of Illinois and scattered pools in the south-central and western parts of the State.

The Mid-Continent Field, including all areas of petroleum production in Kansas and Oklahoma, irrespective of the character or grade of oil produced.

The North Texas Field, embracing a number of detached pools in Wichita, Clay, Shackelford, Palo Pinto, Navarro, and Williamson counties in the north and east-central parts of Texas.

The Northwest Louisiana Field, including areas of oil production in Caddo, De Soto, Sabine, and Red River parishes in the northwestern part of Louisiana, together with adjoining portions of Harrison and Marion counties, Texas.

The Gulf Field, embracing a large number of oil pools associated with salt domes in southeastern Texas and southern Louisiana.

The Colorado, Wyoming, and California fields include all areas of oil production occurring, respectively, in the States named.

Of these, the Mid-Continent has been the most prolific, due to the Cushing Pool, while the Pennsylvania oils of the Appalachian field have always brought the highest price.

Because of its influence on the oil industry as a whole, the Cushing Wells in Oklahoma must be mentioned.

## The Cushing Wells

They were opened in January, 1913. Up to that time, the production of the district was about 1300 barrels a day. The first week in January, 1913, the Cushing field yielded 11,000 barrels a day, which by the end of the month had increased to 20,000 barrels from about 120 wells. In December, 1914, the production was 240,000 barrels a day, and it ultimately reached 300,000 barrels a day in April, 1915, more than two and a half times the total production of the balance of the States of Kansas and Oklahoma.

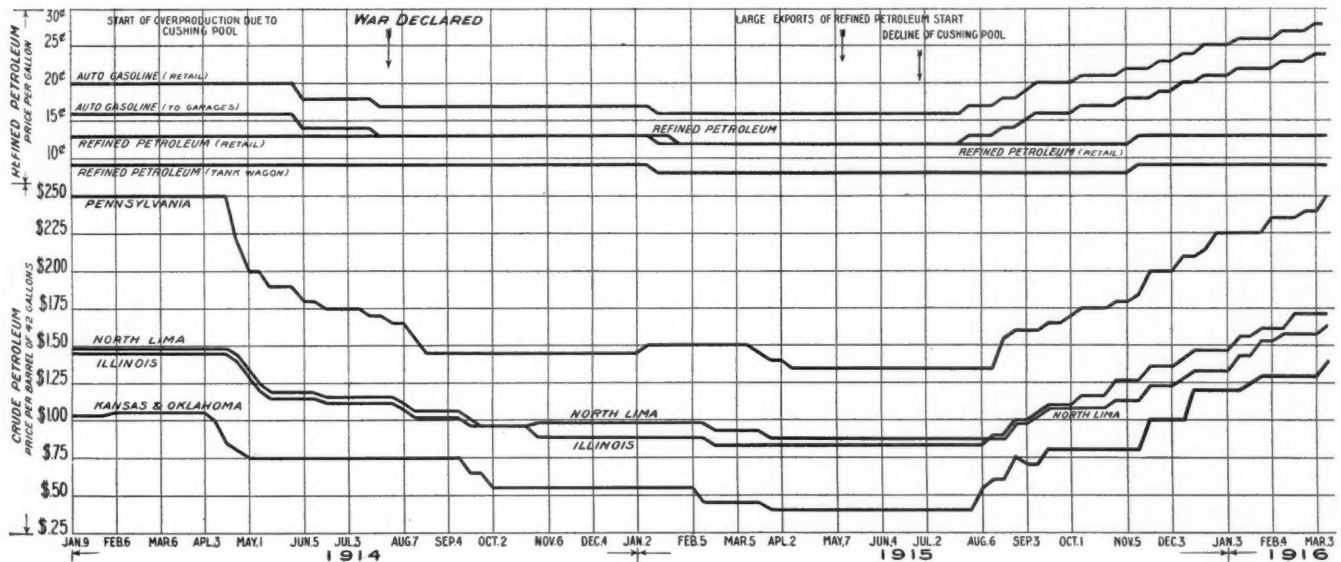
It then decreased to less than 100,000 barrels in January, 1916. This giving out of the Cushing pools was offset to some extent by an increased production from other pools, but as these crudes carried from 5 to 7 per cent. less gasoline than the crude from the Cushing pool, the loss of this phenomenal producer soon became noticeable. However, at the end of 1915, the reserve stock of Cushing proved from 10,000,000 to 15,000,000 barrels larger than at the beginning of that year and were at their maximum in July. From that time on, this surplus has been drawn upon to supply the shortage represented by the difference between daily production and existing transportation and refining capacity. Thus, this surplus had a tendency to steady the oil market, but as the stock was controlled by the larger companies, it has been withdrawn from the open market. Light is thrown on this subject by the report of Secretary Lane of the Interior, in which he

says: "Thus, while there is a market shortage of Cushing crude, which is directly responsible for some of the independent refiners paying a premium of from \$.20 to \$.50 a barrel above the quoted market price, other companies have not exhausted their 1915 surplus of Cushing crude. Since these larger companies have in fact larger stocks than a year ago, it follows that with them the shortage of gasoline-rich crude is at most only threatened and to the extent that these companies are using their 1915

lighter products of 1914 to have exceeded those of 1913 by 500,000 barrels, and the exports for 1915 to have exceeded those of 1914 by 1,500,000 barrels. No Government figures are available since these, but the exportation to Europe continues to increase."

Third: "The depletion of gasoline stocks, due to increased domestic and export demands. On January 1, 1915, the refiners' storage stock of gasoline amounted to approximately 2,000,000

Illinois, and Kansas and Oklahoma. Above these are plotted also from the weekly prices, curves of; "the price of auto gasoline retail," "auto gasoline to garages," "refined petroleum retail" and "refined petroleum in tank wagons." It will be noted that the fluctuation in the price of gasoline has followed to a large extent those in the price of crude. At the left is shown the drop in the price of crude, which may be largely accounted for by the overproduction due to the Cushing pool. The drop in



Price Curves of Typical Crude Oils and Gasoline

surplus, the threatened shortage is not yet a factor in increasing the cost of gasoline production."

In this report, the cause of the phenomenal rise of the price of gasoline is divided into six headings, as follows:

First: "Increase in consumption of gasoline in the United States during 1915, 25 per cent. greater than in 1914 and a similar increase in 1916."

Second: "Increase in exports, the figures showing the exports of naptha and

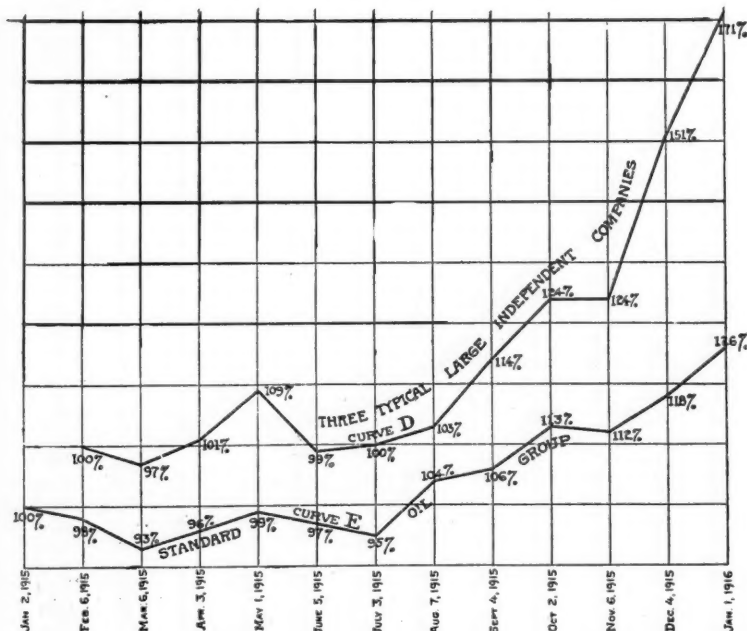
barrels. Inquiry at this time indicates that there is little or no gasoline now in storage."

Fourth: "Decreased production of crude containing a large percentage of gasoline as partially caused by the Cushing pool."

Fifth: "Increase in the price of crude oil, from which the gasoline is made."

The curves herewith submitted are based on the weekly prices of four typical oils, namely, the Pennsylvania, North Lima,

the Pennsylvania, North Lima and Illinois groups were evidently brought about by the same cause. It will be noticed also that the drop in the price of gasoline does not take place coincident with that in the crude, but follows it by some two months, while the rise in the price of gasoline anticipates by a few days the rise in the price of crude. This lagging behind in the drop in the price of gasoline may generously be credited to,—inertia of large business corporations. On these curves are also indicated the point at



Curves by Secretary Lane, Showing Increase in Oil Companies' Stocks

**Curve D:** Market value of the stocks of three typical large oil companies (Associated, Union, and Texas) not listed in the Standard group. Based on percentages of the value on February 6, 1915 (figures for January 1 not available). Curve based on number of shares of common stock of each company times ask price. No account taken of preferred stock. Capitalization from "Moody's Manual"; quotations from "The Commercial and Financial Chronicle".

**Curve E:** Market value of the stocks of 35 domestic companies comprising the Standard Oil Group, based on percentages of the value on January 1, 1915. Anglo-American, International Petroleum, and Penn-Mex, being either foreign corporations or chiefly active in foreign fields, not included. Curve based on number of shares of common stock of each company times ask price. No account taken of preferred stock. Capitalization from "Moody's Manual"; quotations from "The Commercial and Financial Chronicle".



which the exports to Europe begin to increase. The decline of the Cushing pool in July, 1915, is also indicated, and it will be seen that shortly after these two events, the prices began to rise.

In the secretary's report, he has the following to say in regard to the fluctuations in price of gasoline, as compared to that of the crude: "For the last 3½ years (July 1, 1912, to January 1, 1916), considered by 6 months' periods, the price of crude and the price of gasoline have risen and fallen at the same time, but not always in the same amount. Until the first of last July the percentage of fluctuation of the price of crude was considerably greater than that of gasoline, but since that date the percentage rise in gasoline price has been slightly more rapid than that of crude. Since August 1st, gasoline has gone up relatively faster than crude, its rapid rise

is due to vaporization in large part. It begins at the wells where the natural gas escapes instead of being utilized, in field storage the oil evaporates, and also deteriorates, in the pipe lines some is lost through leaks, and in refining from 3 to 5 per cent. is figured as a loss. At the Cushing wells alone it is estimated that the gas escaping amounted to more than 400,000,000 cu. ft. per day or about 11,000 tons of gas, a fuel value equivalent to a train load of coal daily of 300 to 400 cars. Better and more economical methods may be devised and it is time that these losses be looked into with serious intent and prevented as far as possible.

### How Long, at the Present Rate, Will Our Fuel Last?

Again turning to Secretary Lane's report, we find a table which is herewith repro-

duced, giving the percentage of exhaustion of the various fields, and the amount of petroleum still estimated as remaining in the fields.

It also shows the per cent. of gasoline which can be extracted by present processes from the petroleum of these various fields. With this as a basis, the probable amount of gasoline which can be produced from these fields, has been calculated as 892,000,000 barrels. Alaska, Arizona, Utah, New Mexico, Michigan, Arkansas, Alabama, Nebraska, Missouri and Washington are estimated to contain about 75,000,000 barrels of crude. If 16 per cent. be taken as the average amount of gasoline which can be extracted from this oil, this will add 12,000,000 barrels to our total, making it 904,000,000.

The paramount importance, therefore:

Of legislation to prevent increased exportations at high prices, of increasing the production of gasoline from the crude by improved methods, of designing smaller engines which will be more economical, and for immediate relief the development of carburetors and the reconstruction of engines and manifolds, which will make possible the use of low-grade fuels, cannot be over-estimated.

### Alcohol Offers No Relief at Present

At this critical situation, it is natural to turn to a substance which can be produced in unlimited quantities which cannot be controlled by any group of manufacturers and the source of supply of which is cheap and plentiful. Alcohol is such a fuel. Unfortunately, even if there were no Governmental restrictions concerning its production, it offers no present relief, owing to the fact that for economical use an entire reconstruction of automobile engines would be necessary. Instead of 65 to 70 lbs. compression, for efficient alcohol burning, 150 to 175 lbs. are required. This at once

### \*SHALES MAY BE SOURCE OF LARGE FUTURE FUEL SUPPLY

Since the completion of this article, the following important facts in regard to the oil-bearing shales have been obtained. It is estimated by the United States Geological Survey that in Colorado alone there is sufficient shale, in beds 3 ft. or more thick, to yield 20,000,000,000 barrels of crude oil from which at least 2,000,000,000 barrels of gasoline may be extracted by ordinary refining processes.

The area that has been studied comprises northwestern Colorado, northeastern Utah, and southwestern Wyoming. The shale found there contains materials which, when heated, may be converted into crude oil, gas and ammonia. Sooner or later this great source of supply will be utilized to supplement the decreasing production from the regular oil fields. When refined by ordinary methods the shale oil yields an average of about 10 per cent. gasoline, 35 per cent. kerosene, and a large amount of paraffin.

This source, therefore, is capable of supplying double the amount now probable with present methods from all other sources and therefore postpones the date of fuel exhaustion to 45 or 50 years, and this will be increased many times, it is hoped, by more economical cracking and distillation processes.

Field.

Field.	Present Gasoline Factor (Per Cent.)	Estimated Percentage Exhaustion of Total Oil Content	Petroleum Remaining in Fields (Millions of Barrels)
Appalachian .....	25	70	481
Lima-Indiana .....	12	93	31
Illinois .....	18	51	244
Mid-Continent .....	18	25	1874
North Texas .....	20	8	484
Northwest Louisiana .....	20	22	124
Gulf .....	3	13	1500
Colorado .....	20	65	6
Wyoming and Montana .....	20	2	540
California .....	2½	26	2345
Total .....			7629

being uninterrupted by the stationary price of crude during November."

Sixth: Financial Influences. He says:

"The recent rapid increases in the prices of crude oil and gasoline have been accompanied by rapid increases in the market quotations of oil company shares. The market values of the capital stocks of thirty-eight corporations, of which thirty-five are in the Standard Oil group and three are typical large independent companies, have increased remarkably in the last 6 months. (See curves D and E). The stocks of other oil companies probably show a similar rise, but the quotations are not at hand. The thirty-eight companies selected are believed to represent all phases of the oil industry. These rapid increases might be ascribed to the general condition of prosperity and the general upward trend of the stock market but for the fact that during the last quarter of 1915 the oil company stocks did not rise and fall with the market."

### Unused Sources

The speculative tendencies of the oil producers is shown clearly by the fact that oil producing shales which can be mined on a safe basis, very much similar to the mining of coal, are practically left undeveloped, the producers preferring the more exciting method, which may be termed the "speculative method," of boring wells into the oil producing fields. This tendency is clearly shown out by Dr. David T. Day, of the U. S. Geological Survey.

### Waste

The United States Bureau of Mines places the value of the petroleum waste per year at not less than \$50,000,000. A large part of this waste is preventable. It

eliminates it as a fuel for the 2,000,000 vehicles already in use. Under extreme stress and provided the laws were changed, new engines could be produced which will show on alcohol as a fuel, practically as efficient performance as on gasoline, the horsepower being only less in proportion as the thermal units per pound of alcohol are less than in gasoline. Even present type engines can burn alcohol, but do it wastefully, approximately 50 per cent. more being required per horsepower hour than if designed for using alcohol. Under these conditions, alcohol will undoubtedly not enter as an automobile fuel until gasoline, mixtures of gasoline and kerosene or even the lower grade fuels are either prohibitive in price, or exhausted. This puts alcohol out of the present reckoning and no near future relief can be expected from it.

### Benzol

The very prevalent use of benzol in Europe as a motor fuel has led some to expect relief from this source. This hydrocarbon, which is a bi-product of the production of coke, having the formula ( $C_6H_6$ ) although slightly less volatile than even gasoline of the low grade now in use nevertheless serves well as a motor car fuel, it being perfectly possible to start on it with the ordinary carburetor and to use it as gasoline is used without any difficult adjustments. Benzol, however, can only be obtained in this country in limited quantities. There is no general or present means of distribution as exists with gasoline or as would exist with kerosene if it were used as a common motor car fuel.

Approximately 14,000,000 gals. of benzol were produced in coke ovens in the United States in 1915, with a probable output for 1916 of 22,000,000 gals. Unfortunately, this possible fuel is selling at the present time for \$.75 a gal. and not lower than \$.65 in 1000-gal. lots and is in ever increasing demand on account of its use in the manufacture of dyes and explosives and the manufacture of carbolic acid.

A ton of coal now yields, by the present processes, about 2 gals. of benzol. The amount of coal used for coke manufacture now averages about 70,000,000 tons annually, which would mean an annual production of benzol of approximately 3,000,000 barrels. Although there is almost an unlimited supply of coal available, benzol would have to be in general use as a fuel for some time before it would be manufactured for fuel purposes alone in excess of the amount produced as bi-product of the coke industry. As long as the war continues, benzol is in as great demand as gasoline, and, therefore, offers no relief. However, as it can be produced to sell for even less than gasoline is selling for at the present time and did sell at such prices but a few years ago, it may be considered as a possible future source of part of the fuel supply.

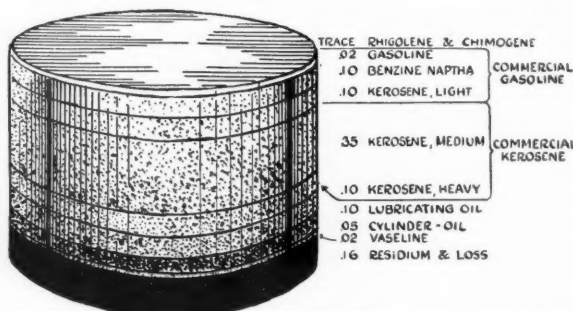
### Even Natural Gas Has Been Used as a Commercial Car Fuel

During the New York Show in 1912, a truck was shown on the street running on natural gas. This was accomplished by means of gas tanks containing approximately 140 cu. ft. of natural gas at a pressure of about 1500 lbs. to the sq. in., the volume of gas carried being about 412 cu.

ft., sufficient to run an ordinary 2-ton truck with load, under average road conditions, from 35 to 45 miles. Gas was said to contain approximately 23,000 heat units per lb. and to require for complete combustion about twenty-five parts by volume of air to one of gas. This, it will be noticed, is almost three times as much air as is used when burning gasoline.

### Kerosene Only Fuel Holding Prospect of Immediate Relief

As gasoline cannot be produced without at the same time producing kerosene, the unprecedented demand for gasoline has caused an overproduction of kerosene. At the present time, kerosene is being stored in vast quantities, and means for disposing of it are being sought by the refiners, as shown by advertising campaigns on kerosene with special trade names. During the Boston Show, such a campaign occupied full pages in the daily papers. From the accompanying diagram it will be seen that what is known as "commercial gasoline" contains 10 per cent. of benzene-naptha, and 10 per cent. of light kerosene.



Graphical Suggestion of the Percentages of Various Oils in the Crude Product

Much to the sorrow of the automobiling public and to truck users, the oil companies have gradually been passing over as part of commercial gasoline even a part of the heavier kerosene, so that the automobile industry has been forced even while burning gasoline to provide suitable carburetors and heating devices for them to handle this mongrel fuel, which, instead of showing 72 to 76 degrees test, is often as low as 54 and practically none of it over 60. Commercial kerosene contains 35 per cent. of medium and 10 per cent. of heavy kerosene.

Next in the order in which the products distill over are lubricating oils, 10 per cent.; cylinder oils, 5 per cent.; vasoline, 2 per cent., while 16 per cent. is commonly considered as loss.

### More Gasoline by Rittman Process

The Rittman process, the most recently discovered method of fractional distillation, is said to yield 200 per cent. more gasoline than by any other known method. It is technically spoken of as a cracking process, which is a breaking up or splitting up of the oil into its various compounds. There are, at the present time, seven plants in the United States producing by the Rittman process. The total output of these refiners, however, is not yet sufficient to cause any appreciable price of production change in the market. However, as this process has been made public and yields greater returns from a given quantity of crude, there is

every reason to believe that it will offer some relief in the near future.

We have now reached the point where the less volatile products must be used for fuel. This means that low grade fuel carburetors must be devised and the engine so modified that they will burn this fuel.

It may be said, "What is the use of using kerosene? The manufacturers will merely boost the price if it is in greater demand." This, of course, is true, to a certain extent, but it is certain also that if both gasoline and kerosene are in use as fuels, the mass of the motoring public will turn to the cheaper fuel, thereby increasing the demand for it and decreasing the demand for the higher-priced fuel. This, to a partial degree, makes an automatic check on the price. In other words, with both in demand, neither one is as likely to reach a prohibitive figure. Kerosene will no longer be a bi-product of gasoline, so to speak, and it will pay to refine all the available crude.

### Problems Presented in the Use of Kerosene

Many experiments have been made for the purpose of determining the possibilities of using low grade fuels. Nearly all of these have shown that they can be used under proper conditions, but it is difficult to put non-volatile fuels into the hands of the ordinary automobile user and get satisfactory results. Clogging up or loading up takes place whenever the engine is too cold, due perhaps to coating or to the engine having stood for some time, also when the engine is throttled the fuel seems to

condense and load up the intake pipe and occasionally flow back into the carburetor. When the throttle is then opened, this excess fuel is drawn into the cylinders, as shown by clouds of smoke, and results in carbonization.

The difficulty of starting the engine is perhaps one of the greatest. This requires gasoline or the use of some outside heating device for the purpose of vaporizing the fuel. These seem to be the only alternatives, with perhaps the one exception of some device which actually ignites the fuel while in the carburetor, as mentioned elsewhere in this paper.

Tests by P. S. Tice show that a starting mixture temperature ranging from 170 degrees to 250 degrees Fahrenheit, depending upon the richness of the mixture, is necessary with kerosene, the higher temperatures being required for the leaner mixtures. These tests also indicated that the fuel consumption decreased as the temperature increased up to 160 degrees F. for the running temperature of the mixture itself, and furthermore that steady running could not be obtained with a mixture temperature of less than 100 degrees F. In these tests, the necessary heat was obtained by an electric heating coil surrounding an 18-in. length of .50-in. outside diameter copper tube, the bore of which was .4375 in. This tube, at its upper end, was attached to a simple T manifold, while its lower end was adapted to take a series of throat pieces of venturi form. The sizes of the throat openings determined the capacity of the carburetor and the relative amount of fuel



discharge was determined by the closeness with which the jet outline was made to approach the point of greatest air passage constriction through the throat piece.

The kerosene used in these tests was .817 specific gravity and the heating coil consisted of 40 ft. of No. 18 Nichrome resistance wire.

The results of such tests indicate the possibility of starting direct on kerosene, provided that makers are willing to devise and provide the public with suitable vaporizing mechanism. With the modern car, there is no lack of current. The electric lighting and starting, which is a part of the equipment of every high-grade machine to-day, gives a ready means of obtaining sufficient electric current for such purposes. However, in spite of these facts, the writer does not know of any car which is now being offered which makes possible the use of kerosene, but even if such vaporizing devices are installed, they must be automatic.

### Thermostatic Control of Heating Coil Suggested

The objection that such a construction would complicate the design is more or less invalid, as the makers have shown no hesitancy in adopting devices which make for better performance simply because these complicate the design. This means that to make such a vaporizer automatic and to take care of all conditions which may arise, under which the special heating of the carburetor will be necessary, some form of thermostat must be installed to care for the switch operation. Thermostats are now in use on the 8- and 12-cylinder engines to control the water circulation. These give practically no trouble; in fact, the average user does not know of their presence.

Such a thermostat might be placed in control of the switch providing current for the vaporizer, so that whenever the temperature falls below the point at which the kerosene will properly vaporize, the thermostat will automatically throw in the switch, or control a solenoid for this purpose and provide the necessary heat. The temperature could be so set that the coil would begin its work before the temperature got too low, so that there would be no period during which the engine would be likely to load up.



If a vaporizer is not used, gasoline can always be used for starting, and the design of the manifold can be such as to supply the necessary heat after the engine is started. This again complicates the matter, as a separate tank must be supplied for the starting fuel, but can be a very small tank on the dash in view of the operator. Again automatic control should be provided. It should not be necessary for the user to turn on the gasoline petcock, but this should be done by a thermostat without his paying any attention to it. In the same way, just as soon as the engine gets up to the proper temperature at which it will care for the lower grade fuel, the heat acting on the thermostat should automatically shut off the gasoline tank and turn on the kerosene. At this point, when both fuels are entering, there may be, of course, with the single adjustment of the carburetor some

overloading or storing up of excess fuel, which for a few revolutions may cause smoke, but this is one of the details which, in all probability, will be taken care of by refinement in design, if any such method is eventually employed.

### Combination Valve

One maker has placed on the market a combination valve which will enable any user to turn on as much fuel from one tank as he desires for combining in any desired proportion with that from another tank; for instance, a tank of kerosene and a tank of gasoline can be used, and these two fuels used separately or mixed in the desired proportion. The entire fuel supply can be shut off at will from the steering wheel to which the device is clamped.

### Vaporizing Manifolds Must be Supplied

The question of manifold design is also very important, this being the only portion of the engine proper which needs redesigning. Owing to the tendency of the low grade fuels to separate and leave a sticky, tarry residue, especially when heat is applied, any exhaust manifold used for the purpose of heating the fuel should be so designed that it could be readily cleaned. Such manifolds are already on the market for use on the Ford car and are sold complete, together with a carburetor for handling both gasoline and kerosene, the combination displacing the exhaust manifold and the present carburetor.

The intake manifold must be short. This is to prevent condensation of the fuel from the mixture on its way to the engine. For the same reason, it should be lagged. Even with the present grade of gasoline in common use, this is an advantage.

(To be continued)

## Activities of the Motor Truck Association of Philadelphia

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### COMMERCIAL CAR JOURNAL OFFICIAL ORGAN



THE monthly meeting held on February 16th, at the Hotel Walton, was a combination banquet, amateur vaudeville entertainment and business session, and in all respects was one of the most successful of any yet held by this organization of the motor truck men of Philadelphia.

Lee J. Eastman, Branch Manager of the Packard Motor Car Co., in Philadelphia, and President of the Association, presided. Memorial resolutions on the death of Harry L. Cooper, one of the members, was read.

City Statistician, Mr. E. J. Cattell, made a happy address, boosting Philadelphia as a business center, and complimenting the Association on the work it has accomplished in bringing the truck industry before the business men of this section.

R. E. Chamberlain, Manager of the Garford-Phila. Co., as a Chairman of the Entertainment Committee, and L. H. Hyne-

mann, of the Republic Truck, Chairman of Attendance Committee, outlined briefly some plans they have for future meetings, a sample of their abilities being presented in the form of a one-act sketch on "Selling an Automobile Truck." The dramatic personnel included Judge Eugene C. Bonniwell, of the Municipal Court, as a prospective customer, and Geo. M. Graham, as a progressive salesman of trucks, who could batter down all the ramparts of defense the most obstinate customer could throw up against him. The sketch was full of clever hits on trucks and salesmen present, and those present joined in hearty applause, showing that they appreciated the local hits made by this clever vaudeville team.

The guests included quite a number of truck owners, who are coming to attend the monthly meetings for the business knowledge of the truck business gained as well as the entertainment offered. H. B. Armstrong, of the Goodyear Tire & Rubber

Co., led the chorus singing and also rendered several solos.

J. Franklin Dechant, an expert on correspondence methods, addressed the meeting on "The Science of Salesmanship," presenting the subject by means of diagrams from the psychological point of view, and detailed the facts that selling has become a science, and that the man who will get the best results is the one who had studied and mastered the rules of marketing a product. Into this problem enters questions of values, attractive presentation, advertising, timely selections, etc. The address, with its wealth of practical suggestions, was closely listened to and applauded by the 165 members and guests present.

Secretary W. H. Metcalf, told of the work the Association is accomplishing in legal matters effecting the operating of trucks in the State of Delaware, and asked the members, also owners of trucks, to report to him if their trucks were interfered with while operating in that State.

The CCJ has most advertisers because it gives them biggest returns

## Truck Display at Boston Show National in Scope



**A**T THE Boston Show there were a large number of trucks and tractors of all shapes and sizes shown, this being practically the only truck show of importance this year. The entire basement of Mechanics Building was devoted to commercial cars, body builders, non-skid chains and things of interest to truck people.

It was noticeable that the trucks are now being equipped with more in the way of electric lights, the smaller ones with starters. Also that hand horns of the long horn vibratory variety were shown on many.

Some of the higher priced trucks were also equipped with temperature indicating devices on the radiator, following touring car practice. Speedometers of special design for trucks, with heavy square steel casings, were also noticeable, as was the fact that many of the trucks used instrument boards upon which the various gages, etc., were mounted, the same as is done on touring cars.

The Signal truck was shown with special nickel plated grid in front of the radiator for radiator protection.

Special lamps which are heavy and staunch in construction, following very much the type of the old-fashioned barn lantern, are now making their appearance. Sloping hoods of the Renault type are more prevalent than formerly. In the small trucks there is a general breaking away from touring car lines and designs in favor of real commercial construction for the entire design. The increase in the number of worm driven models was also very noticeable.

The following is a brief review of the trucks on exhibit:

**R. E. Taylor Corp.**, Eastern distributors of the Garford motor trucks, exhibited a complete line of Garford trucks, both worm and chain drive, including a 6-ton automatic dump truck, a 5-ton heavy duty chassis, a 2-ton chassis equipped with furniture top, a 1-ton chassis equipped with an enclosed top.

The novelty was a 1-ton chassis converted into a short wheelbase tractor, carrying a trailer which was a horse ambulance for the Massachusetts Society for the Prevention of Cruelty to Animals. The trailing vehicle is low hung between high dual pneumatic tired wheels, giving a low body less than 2 ft. from the ground, and is supported at the front on the forward vehicle by special swivel connection, the covering of which forms hood enclosing a winch.

This novel construction is used for getting injured horses or other animals into the vehicle. A false floor mounted on rollers slanting toward the rear is allowed to roll backward until its rear end rests on the ground. The animals are then placed on this platform, which is then pulled into its proper position in the vehicle by means of a winch.

**Vim Truck Co.**, 68 Brookline Avenue, Boston, Mass., A. C. White, general manager of the Vim Truck Co., and C. E. Wheeler, N. E. district sales manager, dis-

tributors for eastern Massachusetts for the Vim Co., exhibited at Boston four Vim trucks, a chassis of Model F, open express; Model D, full panel body with rear doors, and bevel plate side, rear door windows, an eight-passenger 'bus with sliding front door and rear exit door, selling for \$975 f.o.b. Philadelphia.

**Noyes Buick Co.**, 15 Lawton Street, Boston, N. E. distributors of the Buick, exhibited four Buick models. A sight-seeing car of sixteen passenger capacity on a 1-ton chassis; a complete panel body with interior compartments, etc., for the candy trade; a standard open express with cab top, and a 1-ton chassis.

All these cars are fitted as standard equipment with pneumatics, wheelbase, 122 in., four cylinder, 36 h.p. engine. Chassis selling for \$1150 f.o.b. Flint, Mich.

**International Harvester Co. of America**, exhibit by the Boston branch. There were four I. H. models, including two with Renault type hoods, four cylinder block engines  $3\frac{3}{4} \times 5\frac{1}{2}$  in. under the hood, wheelbase, 128 in. Torbensen internal gear drive rear axle, capacity, 2000 lbs., chassis price, \$1500. The same chassis was shown with an open passenger body with seats on each side, having a capacity of sixteen people. This type was provided with side and front curtains of celluloid, completely enclosing the driver and passengers, \$1700 f.o.b. factory.

Two different types of bodies were shown on Model E, namely, an express with top and side curtains, and an open express, selling at \$1025 and \$950 respectively. This is the well-known model with the two cylinder opposed engine under the body, driving by silent chain to the jackshaft and by side chains to the rear wheels. This has either pneumatic or cushion tire equipment, 90 in. wheelbase, and a carrying capacity of 1500 lbs.

**Metz Co.**, Boston branch, exhibited in the basement, two of the Metz chassis with delivery equipment, one being a panel body with side windows, fore doors, windshield and complete equipment including pneumatic tires, Gray & Davis electric light and starting system, price \$600.

The other model shown was an open express with top and side curtains, which sells with or without the electric equipment, price \$525 without, and \$575 with.

**Lippard-Stewart Motor Car Co.** showed a 4000-lb. chassis and two open express models with tops, one of 1500 lbs. capacity Both on pneumatic tires. The two-ton chassis sells for \$2600. The 1000-lb. truck is worm driven. The smaller model is worm driven, and the 1500 lb. may be had with worm drive if desired at \$100 extra, making it \$1600. The small car is also equipped with dyneto electric starting and lighting system as regular equipment.

**Martin Rocking Fifth Wheel Co.**, Springfield, Mass., exhibited in the truck section the Martin Fifth Wheel in four sizes, from the small one which makes a 1-ton truck out of the Ford roadster to the largest, which makes a 5-ton truck into a 10-ton

tractor. These Fifth Wheels are known to our readers, having been described in our columns. The fifth-wheel construction is placed on the rear of the forward vehicle and supports the front end of the trailing vehicle. By means of this device as mounted, the Ford can draw 1 ton on the two-wheel trailer, this combination being shown at the booth in Boston. This 1-ton trailer is being manufactured and marketed by this company. It is fitted with a solid  $1\frac{1}{2}$ -in. rear axle, with 45-in. diameter wheels with  $1\frac{3}{4}$ -in. solid rubber carriage tires. These bodies are open express type, made in nine and twelve foot lengths and sell for \$165, which includes the fifth wheel. The prices of the fifth wheel in the larger sizes are as follows: Sixty-five dollars for the one and two ton; \$85 for the three and four ton; \$110 for the five and six ton.

**Knox Motor Co.**, of Springfield, Mass., showed their latest four-wheel Knox tractor to which was attached a 10-ton, two-wheel style steel tired tractor, with Woods hydraulic hoist and special body of Knox design. These tractors have been described in detail in our columns. The rear, or driving wheels of the tractor are Smith cast metal wheels. The tractor proper sells with complete equipment, including top, electric lights and starter, for \$4500 and as shown with the ten-ton, two-wheel trailer for \$5500. The total wheelbase of tractor and trailer is 204 in., the wheelbase of the tractor proper is 108 in.

**Studebaker Corp.** Boston branch, exhibited a large line of Studebaker commercial cars as follows: One-half ton combination station car and express with side upholstered leather seats, which are removable. This is based on the  $\frac{1}{2}$ -ton truck chassis, mounted on pneumatic tires, has a carrying capacity of eight to ten passengers, and 1000 lbs. when used as a truck, with a guarantee overload capacity of 500 lbs., price, \$875 f.o.b. Detroit.

The 1-ton trucks are new, being the 1-ton chassis which was put out last year for the first time with a few jitney 'bus bodies and is now being shown as a regular model of the truck line. It was fitted with both express and stake bodies, selling for \$1250 f.o.b. Detroit. A feature of the truck exhibit is the fact that all of the truck models up to and including the 3000-lb. truck are mounted on pneumatic tires. The chassis of the 3000-lb. truck sells for \$1250 at the factory. They also showed a 1500 lb. panel delivery car, selling for \$875 f.o.b. Detroit, including electric lights, self-starter and complete equipment throughout.

**Henderson Bros.**, of North Cambridge, eastern distributors for the Signal Motor Co., of Detroit, exhibited at Boston the Signal trucks in  $1\frac{1}{2}$ , 2 and  $3\frac{1}{2}$  ton sizes, these trucks all being worm driven and known to our readers. Prices range as follows: One and one-half ton \$1750, 2 ton \$2100,  $3\frac{1}{2}$  ton \$3000. In addition to the Studebaker trucks they also exhibited a line of their own Henderson



trucks in 1200-1500 and 1 ton capacities. These trucks are made in Cambridge by the Henderson Bros., a wagon concern established in 1856. They will be described and illustrated in detail in an early issue of this Journal. Briefly, the specifications are as follows: The vehicles are made of standard units such as Continental engine, Brown-Lipe transmission, Timken worm axles, Bosch ignition, Gemmer steering gear, etc. They are all pneumatic tired with engines under the hood at the front. All are fitted with windshields, speedometer, lamps, gas tank, and complete equipment for the road.

Model C chassis of 1200 lbs. capacity sells for \$1100 without equipment. It has 134-in. wheelbase, same being a panel job, and sells for \$1350; 1500 lb. 1 ton Model D chassis, price, \$1500; complete with six post or panel side body, \$1695.

**The Autocar Co.**, of Ardmore, Pa., exhibited at Boston a complete line of Autocar trucks, including ten models, coal dump bodies with power hoist, grocers' cars, department store vehicles, express company trucks, oil tank wagons, in fact, a most complete assortment of trucks for varied lines of business. Prices, \$1650 for the chassis f.o.b. point of delivery, bodies ranging from \$150 to \$350 according to style and equipment. These trucks were shown with both solid and pneumatic tires.

**Selden Baker Motor Sales Co.**, Boston distributors for the Selden Truck Sales Co., exhibited at the Boston show a 1-ton worm-driven truck chassis, price, \$1700 f.o.b. Rochester, N. Y. Also a 2-ton chassis worm driven at \$2250, and a 2-ton internal gear drive Selden at \$2000; 3½-ton worm-gear chassis, price, \$2950. On all these chassis bodies were shown with the exception of the internal gear 2-ton, making an exhibit of seven cars in all.

**Stewart Motor Corp.**, H. Ross Maddocks Co., of Boston, N. E. distributors of the Stewart delivery trucks, showed three models; 1000 lb. panel delivery at \$1290; for chassis, \$795; 1500 lb. panel delivery at \$1500; a 1 ton open express at \$1390 for the chassis, body, \$85 extra. These models are fitted with pneumatics with the exception of the 1-ton on which an option is given.

**Boston Federal Truck Co.**, eastern Massachusetts distributors of the Federal Trucks, had on view a 1½-ton chassis at \$1800 and a 2-ton chassis worm driven, which is a new model, at \$2100. On the street they also had a 3½-ton truck for demonstrating purposes. These are all worm-driven models, and have been described and illustrated in our columns.

**Victor Motor Car Co.**, Boston distributors of Menominee Trucks, showed a 1-ton chassis, which sells for \$1575; a 2-ton chassis at \$2240; a 2-ton furniture job, with cab, at \$2490, and a 1500 to 1-ton furniture truck, with cab. This latter car is a gear-driven model, all the others having worm drives. The small car is fitted with pneumatics; all the others are on solids.

**General Vehicle Co.**, of Long Island City, exhibited at Boston a 1-ton chassis showing the method of putting in and taking out the battery by means of a hydraulic lift truck. A 3½-ton Heinz Pickle Wagon at \$2620, without the battery, when sold with battery service was shown.

They also exhibited a G. V. Mercedes gasoline truck of 5-6 tons capacity, selling for \$4500. These vehicles are also well known to our readers.

**C. P. Rockwell, Inc.**, northeastern distributors of the Jeffery Motor Trucks, exhibited a new Jeffery Rapid Service Wagon, which is an entirely new pneumatic tired truck. The forward part is somewhat similar to a large touring car, having a cowed hood, four cylinder 3¼ by 5¼ engine, three-plate dry disc clutch, shaft drive to a spiral bevel gear rear axle. Fenders are crowned with running boards connecting them. The single seat is full width, with fore doors and windshield. Back of the seat is left open to the chassis frame and takes any type of body for light and quick delivery service, such as for the grocery, meat, department store trade, etc. Chassis complete, electric light and starting, seat, windshield, etc., with the exception of the body, sells for \$900.

They also exhibited a new 2-ton Jeffery Quad, which was shown at Boston for the first time at any show. The features of this truck have been covered in this journal. The chassis price is \$2850. It was shown with a metal body and hand-operated hoist.

**Walter J. Forbes**, distributor for the Highland Body, exhibited at the Boston Show, a lengthened pleasure car chassis, by means of the Forbes system, on which patents are pending. The customary length to which the Ford is lengthened is 36 in., making a wheelbase of 136.

They showed a lengthened Ford chassis fitted with one of their special bodies built at the factory in Reading, Mass., with undertakers' body, 7 ft. long by 6 ft. high, back of the driver's seat, 42 in. in width, and selling for \$1250 as a complete outfit.

They also showed another Ford chassis lengthened, equipped for the grocery or importers' business, with top and side curtains, windshield, etc., selling at \$800, with oversize tires and demountable rims.

The six-post delivery body, equipped with clear view windshield, fore doors, for use on Ford or medium-size cars, sells for \$125.

In addition to these, seven Highland bodies were shown.

**Maxwell Commercial Coburn-Draper Motor Co.**, of Boston, exhibited for the first time a Maxwell car with commercial body, making a delivery vehicle of 1000-1200 lbs. The cars shown were a panel job, with a combination tail gate and panel door rear. This is so constructed that it can be either used as two doors hinged at the side or as a tail gate in the ordinary manner. Body 43 in. in height by 47 in. wide by 60 in. long, and sells for \$750 f.o.b. Boston. These are based on the Maxwell chassis and fitted with pneumatic tires on demountable rims.

A four-post whalebone body was also shown with Kinsley's commercial body rack which is suspended at a proper height from the ceiling by four pendent hooks so that it is quickly removable. Completely equipped as shown, this model sells for \$750, or \$685 without rack. Body dimensions on this were 42 in. width by 63 in. length back of the seat.

**D. C. Tiffany Co.**, distributors of the Ward Special Electric, exhibited at Boston

a Ward Special Electric, selling at \$875, which includes lead battery. With Edison battery the price is \$1350. These trucks have been described in our journal.

**Diamond Motor Truck Co.**, of New York City, exhibited at the Boston Show—

A ¾, 2-ton and 3½-ton chassis of the Diamond T trucks. All of these models are worm driven, and the smallest truck sells for \$1175; the 2-ton model for \$2200, the 3½-ton for \$3300.

This company also makes a 1-ton and a 1½-ton model, which were not shown. The small truck is fitted with solid tires as regular equipment, but can be had with pneumatics as an extra, if desired. These cars are all powered by four-cylinder Continental engines, standard units being used throughout the construction.

**Monahan Vehicle Co.**, of Providence, R. I., exhibited one of their metal hydraulic truck dump bodies, which can be raised to a 50-degree angle. This uses the Woods hydraulic hoist. This company makes all types of bodies, both metal and wood.

**Chase Motor Truck Co.**, of Syracuse, N. Y., showed their Model O, 3½-ton chassis, selling for \$3300. The rear axle is of Sheldon worm construction, with 36x4 in. dual rear tires and single solid fronts, the rear springs being underslung, giving the whole body a low position. The chassis includes a cab, with side and front curtains, oil lights and tail light. Wheelbase is 175 in., engine 4¼x6 in. The three-joint driving shaft extends to the rear, and this shaft is supported at the middle of the chassis in a self-aligning ball bearing, taking care of all tendency to whip.

**Locomotive Co. of America**, Boston branch, had on the floor: One 4-ton standard chassis, selling at \$3650. Also the same type chassis equipped with a Monahan hand dump metal body.

**J. W. Maguire Co.**, 745 Boylston Street, Boston, exhibited a complete line of the Pierce-Arrow trucks, including three 2-ton chassis, two 2-ton trucks, one 5-ton chassis, one 5-ton power dump hydraulic hoist by electric motor, dumping time being 5 seconds. The 2-ton model had a special combination furniture and passenger body somewhat unique in design. The seats at each side were arranged so that they could be quickly removed, the seats themselves carried the back board. For greater capacity the tail gate, when let down, forms a part of the floor, with a removable step underneath. Extra sections similar to the sides are placed on this tail gate, virtually making the body 2 ft. longer, and supplying extra seating capacity. This body is suitable for carrying children to school or for picnic parties, and can be instantly converted into an ordinary furniture truck. The price, completely equipped with cab, side and front curtains, oil front and rear lamps, etc., \$3300.

They also exhibited on a special stand the worm and worm wheel, which is used as a standard equipment in all Pierce-Arrow trucks.

**White Co.**, as usual, had a very large exhibit in the center of the basement, including all sizes and capacity trucks, with everything from Rubberneck wagons to fire engines. This was the largest exhibit on the floor.

**Commerce Motor Car Co.**, of Detroit, Mich., exhibited one 1500-lb. express type truck, with standing top and side curtains and full panel truck, with rear doors. Wheelbase, 120 in., with the Commerce full floating bevel drive rear axle, giving 6:1 reduction. The price of the Commerce truck is \$975, with a choice of three types of bodies—open express with driver's cab, stake truck with standard cab, and full panel job, which is furnished with either the full rear doors or tail gate. A few slight changes have been made this year, such as tapering the hood slightly upward toward the dash, and the use of a Rubberoid covered dash, which does not scar or chip off, and remains a good, permanent color, and a specially designed windshield hinged at the center. The windshield frame and its support on the dash also form a handle on each side, these being made integral.

**L. M. Cotton, Inc.**, of Boston, body makers, with factory at Amesbury, exhibited in the truck section a line of their bodies. A furniture body on a Maxwell; panel body with side wings on a Ford car, selling for \$140.

They also exhibited four bodies as follows:

A Long-Ford type body with curtains, selling for \$125; an open four-post, suitable for Ford's or other cars, up to 126-in. wheelbase, \$70. Amesbury six-post job, with side curtains, finished in natural wood, \$95. mountain wagon with three seats, fully upholstered, eight-passenger capacity, selling for \$125.

**Kelly-Springfield Motor Truck Co.** had a 3½-ton K-40 chassis, which sells for \$3400 f.o.b. Springfield, Ohio. A 1½-ton chain-drive mill truck, this special job selling at about \$2300.

An entirely new 1½-ton chassis, known as the K-32, which is a worm-driven model, was also shown. Complete details and illustrations of this model will appear in our next issue.

**James Cunningham Sons Co.**, of Rochester, N. Y., Boston branch, 1117 Commonwealth Avenue, exhibited in the truck section a Motor Hearse at \$5000, and a motor wagon at \$4000. This hearse was a fine example of hearse construction, being finished throughout in solid mahogany, silver trimmings, electric lights inside and outside, draperies in gray broadcloth, etc.

**New England Truck Co.**, of Fitchburg, Mass., showed the Necco Trucks, having a four-cylinder engine, 2-ton worm-driven chassis, standard equipment, cab and curtains, Prest-O-Lite tank, headlights, etc., at \$2350.

Also a fire combination chemical and hose on a six-cylinder chassis, which is also worm driven, fitted with dual rear wheels 38 in. in diameter, and carrying a 40-gallon chemical tank also 400 ft. of ¾-in. chemical hose, and 1000 ft. of 2½-in. hose.

**United Motor Truck Co.**, of Grand Rapids, Mich., exhibited their well-known trucks at the Boston Show, a feature of the exhibit being their 3½-ton chassis, selling at \$2900, with complete equipment.

**West's Steel Casting Co.**, of Cleveland, Ohio, exhibited among the trucks a line of their steel wheels for commercial cars. Novel among these was a 10-ton trailer wheel with Y spokes, webbed on each side and bushed with a Phospor bronze

sleeves 14 in. in length and 4 in. in diameter. The wheel is 48 in. in diameter by 10 in. width of felloe, and weighs 980 lbs. It is designed for use on 10-ton two-wheel trailers, used in connection with a short wheelbased tractor truck.

They also exhibited a new cast steel "rough roads" wheel suitable for use on war vehicles, which have to traverse soft ground, and for use on deserts. This wheel is arranged to use ordinary roller bearings and weighs 1100 lbs. The diagonal cleats on the wheel rim are put on with bolts with flush heads, so that they can be quickly removed if desired, these being drilled to templates so they all fit exactly in place. The front wheel made for the Fifth Avenue coaches, also with Y spokes, and weighing but 90 pounds for the 3-ton size, was also shown. The center of the rim of this wheel is over the steering pivot, making for easy steering.

**Transport Tractor Co., Inc.**, of Long Island City, N. Y., exhibited at Boston Show for the first time at any show their short wheelbase Tractor, wheelbase being 80 in. This is fitted with a special fifth wheel, which is supported on the forward end of a trail vehicle. It has 5 tons capacity, and sells for \$2500. This is complete with cab top, speedometer, side and rear lights. It is powered by the Buda four-cylinder, 25 h.p. engine. Brown-Lipe transmission and short shaft to Hindley worm axle. It is fitted with single solids at the front 34x3½ in. and dual 34x4 in. solid rear tires with block tread.

The feature emphasized by the makers is economy of operation with this type of vehicle, hauling its load instead of carrying it, and the possibility of the use of other than rubber tires on the trailer and the use of two or more trailers.

**The Wentworth Fosdick Co.**, of Boston, northeastern distributors for the Republic Motor Co., of Alma, Mich., exhibited at Boston Show the ¾-ton Model F Truck, with a special "bus line body. This body is built along street car lines, having a seating capacity of sixteen, leather upholstered seats running around the sides and rear, the rear seat being removable, with a door and rear step, which can be used if the body is employed in other work.

This car is of the "pay as you enter" type, with a fare box at the driver's right hand, his seat being at the left, and the door lever is at the center. The small lever at the driver's side opens and closes the center door, which is on the right or curb side. The car is fitted with drop side windows for advertising cards, and with push buttons to signal the driver similar to street car practice.

**The Fostoria Light Car Co.**, of Fostoria, Ohio, exhibited not only their small five-passenger touring car but the same chassis fitted with a small top express body, 1000 lbs. capacity, and sells for \$625 f.o.b. Fostoria, Ohio. This includes the Allis-Chalmers starting system, wind shield, electric headlights and tail lights. This car has a four-cylinder Sterling engine of the valve in the head type, 3x4½ in., developing 26 h.p.; the ignition is Atwater-Kent. Gasoline is fed by the Stewart vacuum gasoline feed system. The car is fitted with 30x3½ pneu- matics and non-skid tires.

**Denby Motor Truck Co.**, of Detroit, exhibited at Boston Model D 1½-ton chassis, with internal gear rear axle. Rear axle is one of the features of this truck. Heavy bars, steel channel section, frame being also a feature, and special springs. Rear 52 in. in length by 3½ in. width. Very flat. Top leaf of this spring being horizontal when the load is on. The gasoline tank is cylindrical and mounted crosswise, forming the top of the dash, giving positive gasoline feed by gravity, doing away with all pressure feed or vacuum feed and large pipes from tanks located lower down or at the rear. The entire dash foreboard construction is of pressed steel, making a light and rigid job.

They also showed their small 1500 lb. truck, which has solid tires as standard equipment, there being a novel construction connected with the body mounting. Instead of cross-frame members within the frame, channel sections have been placed above the frame, which also acts as slides for the body, saving between 800 and 1000 lbs. in weight and permitting the body to be very low as compared with other trucks of the same size and capacity, the loading platform being but 30 in. from the ground. The model shown had an open express body, with top and side curtains, windshield, and selling for \$950.

**Packard Motor Car Co.**, of Boston, Mass., exhibited at the Boston Show one 1-ton chassis, with starter and electric lights; one 1-ton, with an ice cream body; one 1-ton florist on pneumatic tires, same being an enclosed panel body job; one 1½-ton elevating dump coal job, this being the only elevating dump body exhibited at the Show, although there were several other dumping bodies shown; one 2-ton steel side body; one 3-ton express body, designed for produce; one 4-ton special, long wheelbase, 18 ft., a special machinery manufacturer's truck; one 4-ton sand dump body truck.

**Indiana Truck Co.**, of Marion, Ind., exhibited two chassis of the Model S 1-ton worm drive truck, the smaller one with a four-cylinder 3½x5 engine, and the larger, six cylinder, 3x5 in. The makers state that there is considerable demand for the six cylinder trucks of this size, especially when operating on pneumatic tires.

The steering wheel is at the left, with a fixed spark Bosch magneto, the throttle lever being under the wheel. The gear shaft and brake lever are at the center. The accelerator, instead of being a button, which requires your foot to be lifted from the floor and operating by a push, which may be affected by road jounces, is a small lever operated by the side of the foot, and protruding through a beam of the floor board. The foot can, therefore, remain solidly on the floor, the side pivoting on the heel operating the accelerator.

The four-cylinder truck sells for \$1285, and the six cylinder for \$1335. Both are of the same capacity, 1 ton.

"Chase-Em," a house organ which the Chase Motor Truck Co., Syracuse, N. Y., started some time ago, has been received with great enthusiasm by the various Chase dealers. A recent issue contains a very interesting editorial by the president of the company, Mr. A. M. Chase, in which he makes a strong plea for preparedness.



# THE COMMERCIAL CAR JOURNAL

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## THE TRACTOR AS A PART OF THE COMMERCIAL CAR INDUSTRY



**P**OWER farming has grown at the same tremendous pace as the automobile industry. The most potent factor in farm power is the tractor. The tractor is 90 per cent. a development from the automobile. A large part of the tractors employ multiple cylinder, vertical, internal combustion engines of automobile or truck type. Many of them even follow automobile lines, having a hood at the front, fitted with a radiator, provided with wheel steer, and even, in some instances, with the familiar automobile dash. The power plant, with its numerous accessories, may be said to bodily belong to the automobile industry. The ignition apparatus, carburetor, the water circulating pump, etc., are largely of automobile type.

As close as the tractor is to the commercial car industry, but few truck agents or garagemen are handling them as a part of their business. Naturally, the city agent will never be interested, but how about the innumerable agents for commercial cars in rural communities and in the smaller cities which are surrounded by farming sections. Are they not logically the men, with the knowledge and the service equipment, to take on, as an additional line, the farm tractor?

The word SERVICE in connection with the sale of any piece of mechanism, and particularly the farm tractor, is an important word. No one better understands the necessity for service than the truck dealer, and he knows that the farm tractor requires the same kind of service that he is equipped to give to the purchaser of trucks. Is he not in a better position to give this necessary service than the average implement dealer?

The future of the tractor is not questioned. Its influence on farming is as revolutionary as that of the automobile has been on modern transportation. The future growth of the tractor business and its importance cannot be overestimated. The question is, who is going to get the business? The rural automobile dealer and garageman are the logical answer. Will they take advantage of their opportunity?

## EFFECT OF FUEL PRICE ON TRUCK DESIGN



**T**HAT gasoline will never for any extended period again sell as low as it has been within the last two years is the belief of those who have investigated the fuel situation. That there will probably be a drop before this coming fall is expected, but ultimately the price level is going to remain at a point which is almost prohibitive for the operation of commercial cars.

The effect on truck engine design, on carburetor construction and on gear ratios may, to a certain extent, be predicted as follows: High fuel cost necessitates the construction of motors of greater fuel efficiency. This means that engines will have to be smaller and of still higher speed, that long strokes will predominate even on these high speed engines. Means for cutting off the fuel supply when coasting must be provided. Auxiliary air devices, which will permit of diluting the mixture to the limit, will be necessary. Starters will be used on trucks.

As the refiners are gradually forced to supply more gasoline than in the past, still lower grades of gasoline will be forced on the public, and whether the manufacturers of trucks wish it or not, they must meet these conditions.

Carburetors and engines designed outright for the purpose of operating on kerosene will have to be employed even if the makers at the present time are apparently trying to ignore it. To successfully cope with these low grades of fuel, starting devices must be supplied. Here will be opportunity for the starter makers, as engine starters must eventually form a part of truck design. Hand cranking will eventually be a thing of the past. Special carburetors with the maximum heating effect will make their appearance. Some may be exhaust heated, others heated with the circulating water, and still others by electrical coils under special thermostatic control. New manifolds with carburetors closely attached, or forming almost a unit with the manifold, will make their appearance, giving the shortest possible intake pipe length, and thereby reducing fuel, charge, condensation to the minimum.

Combination carburetors, which will handle anything from gasoline down to the lowest grade distillate will probably be devised. Gasoline may be used for starting, but the mass of running must be done on some other fuel, if commercial car economy is to be kept at the lowest possible point.

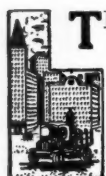
With smaller high-speed engines, greater gear reductions will be required and the engine will be permitted to

The CCJ has most readers because it gives most information

run at more nearly a constant speed. This will result in smaller and lighter weight power plants to accomplish the same work.

These are but a few changes which the fuel situation must of necessity force the designer to make. Engine starter makers, carburetor makers, engine manufacturers and those producing complete trucks should, at the present time, be working on these problems to be ready before it is too late. Let 1916 produce successful low-grade fuel burning engines and prevent another setback to the industry, which is now on the high road to a most wonderful and permanent success.

## COMMERCIAL CARS AND THE FUEL SITUATION



**T**HERE is no more important subject confronting the motor truck makers than that of the cost of gasoline. The increased demand on the refiners has been so great, owing to the increase in the number of trucks and pleasure cars and also due to the incessant demand for fuel by the European nations, that the supply is gradually but surely being exhausted.

In this issue appears an article of our Managing Editor on this subject. His calculations as based on Government figures, show that unless permanent remedies are applied within a few years, it will be impossible to supply the gasoline necessary for the automobile industry.

These remedies, as suggested in this article, consist of increasing the available crude supply by working the practically ignored shale beds; by opening up and developing new crude oil fields, by curtailing the tremendous losses now known to exist, both at the oil fields and in the pipe lines; by increasing the percentage of gasoline which can be made from the crude by means of special and new processes such as the Rittman; by legislation looking toward the curtailment of exportation of gasoline and distilled products; by developments in carburetors and engines which will permit of using lower grade fuels such as kerosene in the existing automobiles and trucks, and by creating, if possible, some independent refineries backed by automobile interests, pledged to place the product on the market in as large quantities as the capital available will permit and at the lowest possible price, in order to create competition with existing makers.

If such remedial measures are not made effective within a short time, the total resources of this country, at the rate gasoline is being consumed, will not last over 15 years.

It is, of course, believed that some or all of these measures will be made effective, and that therefore there will be no

fuel famine, but steps must be taken at once or in the mean time the price will soar to such a height that both the pleasure and commercial car industries, and particularly the latter, will be most seriously affected.

## Steel and Rubber Markets

### Domestic Steel Business Taxes Mills

Rail buying has been one of the prominent features of the domestic steel market since the first of the month. The advance \$5 per ton by the Carnegie Steel Co. on steel shapes resulted in a tremendous influx of orders that had been held up in hopes of an easier market. Large consumers of steel show every desire to place orders as far in the future as mills care to accept, and it is expected that before the end of the second quarter mills will have booked orders for a large part of their capacity for delivery next year. Quotations on March 11th were:

### STEEL PRODUCTS PRICES

Bessemer billets, per ton, mill	40 00 a	41 00
Open hearth, per ton, mill	40 00 a	41 00
Sheet bars, per ton	41 00 a	42 00
Forging billets, per ton, mill	60 00 a	65 00

The above prices are at tidewater, in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., \$2 per ton additional is charged, and less than 1000 lbs., \$8 per ton additional.

### SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots are \$2 per ton higher:

Gage—	Black.	Galvan- ized.	Gage—	Black.	Galvan- ized.
Nos. 10 and 11—			Nos. 15 and 16—		
No. 12—	3 75a4 00		Nos. 17 to 21—	2 95a3 05	3 95a4 20
Nos. 13 and 14—	3 85a4 10		Nos. 22 and 24—	4 10a4 35	
	2 85a2 95	3 85a4 10		4 30a4 55	

Above prices are for Bessemer stock. For open hearth stock \$2 per ton advance is charged.

### Rubber Market Steady

No material changes have developed in the rubber market since our last report. The price of Up-River fine has been fluctuating between 74 and 78 cents. Quotations on March 11th were:

<b>Fara—</b>			Brown crepe	.....92	a....
Up-river, fine, per lb77	a....		Smoked sheets	.....93	a....
Up-river, coarse	...59	a60	<b>Centrals—</b>		
Island, fine	.....69	a70	Corinto	.....58	a....
Island, coarse	...36	a....	Esmeralda	.....57	a58
Cauchó, ball, upper	...61	a....	Guayule	.....	a....
Cauchó, ball, lower	...58	a....	Balata, sheet	.....61	a62½
Cameta	.....37	a38	Balata, block	.....42	a49
<b>Ceylon—</b>			<b>African—</b>		
First latex pale			Massai, seed	....	a....
crepe	.....94	a....			

### DOMESTIC SCRAP RUBBER

<b>Tires—</b>		
Automobile	.....	6½ a ....
Bicycles, pneumatic	.....	3¾ a ....
Red	.....	12 a 12½
Inner tubes, No. 1	.....	29 a 30
Inner tubes, No. 2	.....	11½ a 12

### CARTER CARBURETOR TO BE SOLD DIRECT

Carter Carburetor Co., St. Louis, Mo., which has been selling its products through the H. W. Johns-Manville Co., New York City, will hereafter market the same through its own sales department. The Johns-Manville Co. will continue to sell the Carter carburetor and Carter gravity tanks, but will no longer handle the sale of these to automobile manufacturers. The sales to the trade will be handled entirely through jobbers and general distributors, the policy of the Carter Co. being to absolutely restrict the sale of its products to the jobbing trade. Hugh H. C. Weed, general manager of the carburetor department of the Johns-Manville Co., has become vice-president and

general manager of the Carter Carburetor Co., with offices at the factory, and will direct the sales policy of the company. The Carter Co. will make a specialty of service, with factory experts located in every large city, under the direct supervision of the service department at the factory.

**Maxwell Motor Co.**, has decided to enter the light delivery car field, the standard Maxwell chassis for which the buyer can have a body designed and built locally to fit his requirements, being used. With the car the Maxwell Company furnishes a scale of dimensions which enable any bodymaker to fit exactly the standard arrangement for attaching this part to the frame. The chassis is furnished complete, including cowl, instrument board and electrical equipment.

### PIERCE-ARROW PLANT CLOSED ON ACCOUNT OF STRIKE

Owing to a strike of Machinists on March 3d, all departments of the company on North Elmwood Avenue, Buffalo, N. Y., were shut down. About one thousand men went out in response to a strike call issued by the machinists' union leader, and, as it was practically impossible to operate with short forces of men, it was decided to shut the entire plant.

In the February issue of the *Commercial Car Journal*, pages 30 and 34, the S.A.E. horse power ratings of the trucks made by the Signal Motor Truck Co., Detroit, Mich., was incorrectly given. The 2-ton Model should be 27 h.p., and the 3½-ton Model should be 32 h.p.



## Personal Items

**Frank H. Pietsch** has been made manager of the truck department of the Chicago territory for the Packard Motor Car Co.

**A. J. Brosseau**, for twelve years general manager of the Gail Mfg. Co., has become vice-president of the Federal Motor Truck Co., Detroit.

**H. F. Belcher**, who has been working out of the Chicago office of the Burd High Compression Ring Co., has been transferred to the Peoria, Ill., territory.

**C. O. Schlagenhauf**, formerly with the L. C. Smith Typewriter Co., has joined the Burd High Compression Ring Co., and will make his headquarters at the Detroit branch.

**A. E. Holden** has become assistant sales manager of the Service Motor Truck Co., Wabash, Ind. He was for over five years advertising and sales manager of the Double Fabric Tire Co., Auburn, Ind.

**J. E. Gramlich**, formerly engineer and superintendent of the Chase Motor Truck Co., Syracuse, N. Y., has resigned that position to become engineer for the Thermoid Rubber Co., of Trenton, N. J.

**L. F. Stevens**, formerly manager of the Chicago branch of the Chase Motor Truck Co., has been made division sales manager for the northwestern States with headquarters at 2421 South Park Avenue, Chicago.

**J. K. Bond**, for several years associated with the Thomas B. Jeffrey Co. in the truck department, has become truck sales manager for the Reeke-Osmond Motor Car Co., Milwaukee, Jeffrey distributors for Wisconsin and Upper Michigan.

**L. G. Rasmussen**, for a number of years connected with the Woods Vehicle Co., has joined the selling organization of the Burd High Compression Ring Co., and will have headquarters in Chicago, covering the northern Illinois territory outside of Cook county.

## TRUCK USED FOR SOWING OATS

Mr. Heeger, of the North Fort Worth Ice and Cold Storage Co., recently used a 3½-ton chain drive Wichita truck to sow oats on a 100-acre farm with much success. Ice deliveries being slow at this time of the year, Mr. Heeger decided to experiment with the truck as to its adaptability for farm work. The work of the truck exceeded his hopes in every way, averaging fifteen acres a day. This is interesting compared with the fact that four good mules can cover only six acres daily.

## GOODYEAR TO MAKE BETTER CITIZENS OF ITS MEN

Goodyear Tire and Rubber Co., Akron, Ohio, in order to extend to its employees of foreign birth opportunities of making themselves better citizens, is organizing classes in the English language and American citizenship. Announcements of the coming classes have been posted in the plant printed in the various languages spoken. These classes will start at once, at hours convenient for every man. The Goodyear plant works twenty-four hours a day, necessitating three shifts, but both day and night classes will be arranged, so that all who desire may take advantage of them. In the English classes instruction will be adapted to the needs of the men. In the citizenship classes American history will be

taught, together with the fundamental principles of our government, the geography of our country, and other subjects necessary to make intelligent citizens and voters of the men.

## AUTOCAR BUSINESS NECESSITATES ANOTHER NEW BUILDING

Plans have been completed and contracts let for another new factory building for the Autocar Co., Ardmore, Pa. The building will be on Greenfield Avenue, directly opposite the present Autocar road testing plant.

This new two-story building will have 85,000 sq. ft. of floor space, and will be devoted entirely to the manufacture and painting of Autocar bodies and the final assembly of body and chassis. The walls will be fireproof, and as double insurance against complete fire destruction, the building will be divided into zones, each one a complete plant in itself.

This body-building plant together with the new five-story factory addition now nearing completion will more than double the output of Autocars.

## New Truck Agencies

**Vim Truck Co.**, 68 Brookline Avenue, Boston, Mass., has been formed by A. C. White, Jr.

**Hermitage Hardware Co.**, Nashville, Tenn., has taken the agency for the Commerce motor trucks.

**Universal Auto & Supply Co.**, Oklahoma City, Okla., has secured the agency for the Wichita truck.

**Bellenger-Denman Co.**, Court Street, Gadsden, Ala., has taken the agency for the Vim commercial car.

**Chase Truck Agency** in Chicago has been taken over by the L. P. Rasmussen Co., 2419-21 South Park Avenue.

**Jacob Weber's Sons**, 532-36 East Market Street, Louisville, Ky., have taken over the Service and Dart truck agencies.

**Autocar Sales & Service Co.**, 1311 Cathedral Street, Baltimore, Md., will occupy garage being erected at 1307-09 Cathedral Street.

**Chase Motor Truck Co.**, 2602 North Avenue, Milwaukee, Wis., has changed its name to the Pauly Motor Truck Co. A garage and repair shop will be conducted and several commercial cars handled.

**Lawrence & Co., L.**, 292 Halsey Street, Newark, N. J., has opened a Chicago branch. J. Douglas Kaufman, sales representative of the American Die & Tool Co., previous to becoming manager of the Service Gear & Machine Co., has been appointed sales manager of the American Die & Tool Co. He remains as manager of the Service Gear & Machine Co., recently incorporated for the manufacture of repair parts for obsolete and orphan cars.

**Stegeman Motor Car Co.**, Milwaukee, Wis., has appointed the following truck agencies: Moran Trucking & Sales Co., 506 Fulton Street, Indianapolis, Ind.; Standard Motor Sales Co., 3317 Grant Blvd., Pittsburgh, Pa.; Slaysman & Co., Pratt and President Streets, Baltimore, Md.; Miller Bros. Auto and Supply House, 61 Pierce Street, Washington, D. C.; A. R. Gould & Sons, 415 Linden Street, Scranton, Pa.; James Motor Co., 1503 Michigan Avenue, Chicago, Ill.; Buckley & MacDonald, Tucson, Ariz.

## New Incorporations

**Ben Hur Motor Co.**, New York City, capitalized at \$1,000,000, has been incorporated to manufacture motors, etc.

**Motor Truck Sales Co.**, New Haven, Conn., has been formed with the following officers: Andrew H. Tryon, president; Jos. Coulter, vice-president; Thos. H. Wood, treasurer, and Jos. A. Howard, secretary. Capital stock, \$13,500.

**Lane Motor Truck Co.**, Kalamazoo, Mich., has been formed with a capital stock of \$25,000 to manufacture a 1200 to 1500-lb. truck, with four styles of bodies—express, open flareboard, stake body and stationary top flare body.

**Premier Cushion Spring Co.**, Detroit, has been organized with Wm. D. McCullough as president and general manager. W. A. Falls, vice-president and factory manager, and J. A. Schulte, secretary and treasurer. A plant at St. Aubin and Hals Streets has been secured, and the present output of 1000 sets of springs daily will be increased, as the company has so many orders that the demand already exceeds the production.

**Bettendorf Trailer Co.**, Bettendorf, Iowa, which has been making trailers for some time, has now been incorporated with a capital stock of \$100,000, with the following officers: J. W. Bettendorf, president; August E. Steffen, vice-president; B. F. Aufderheide, secretary-treasurer, and A. J. Jackson, general manager. A shop 300x300 will be erected at a cost of \$15,000. Automobile trailers will be manufactured in several different models up to 6-ton.

**States Motor Car Mfg. Co.**, Kalamazoo, Mich., capitalized at \$600,000, has been formed to manufacture pleasure cars and light delivery wagons. An up-to-date plant containing 340,000 sq. ft. of floor space has been secured, and deliveries will begin about April 15th. John A. Pyl is president; James H. Johnson and B. R. Barber, vice-presidents; Samuel Hoekstra, secretary-treasurer. The truck will be distributed through the States Motor Car Co., with an aggregate capital of \$1,700,000. W. B. Smith is general sales manager.

**Republic Motor Truck Co.**, Alma, Mich., has just completed several new buildings, which have increased the output considerably.

**Loose-Wiles Biscuit Co.**, New York City, has increased its fleet of Packard trucks to 50 vehicles, having recently purchased 17 light service Packards.

**Des Moines Chamber of Commerce**, through its Agricultural Committee, is planning for the first annual tractor show to be held there next fall. E. T. Meredith is chairman of the committee in charge of the arrangements.


**Four Wheel Drive Auto Co.**, Clintonville, Wis., has increased its capital stock from \$250,000 to \$500,000. Officers were re-elected as follows: W. A. Olen, president; John Kalmes, vice-president; David Rohrer, treasurer, and Frank Gaus, secretary.

**Zinrhed Flour Co.**, St. Louis, reports a remarkable record of a Dorris 3½-ton truck during January, when it made 124 trips, covering 907 miles on only 181½ gallons of gasoline and 5 gallons of oil to haul 1,015,760 pounds of flour. The machine replaces three teams of horses.

**Timken Roller Bearing Co.**, Canton, Ohio, recently put in operation, at a cost of about a half million dollars, a seamless steel tube plant, that is said by men in the steel business to be one of the most up-to-date tube mills in this country, and one particularly adapted to the production of high quality mechanical tubing.

# CCJ GALLERY of SALES MANAGERS

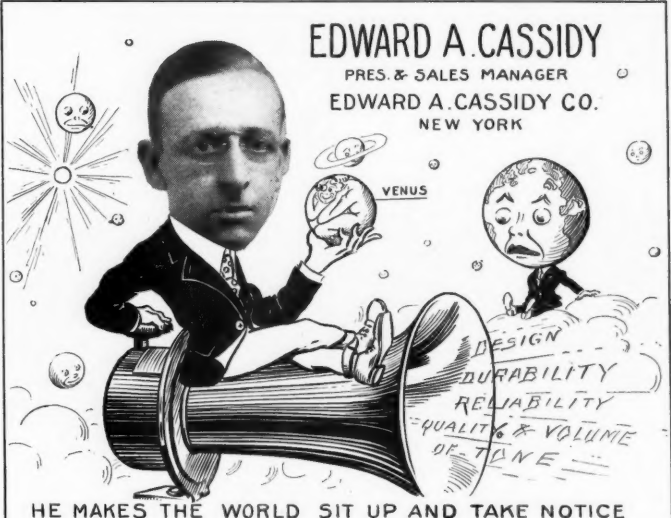
**W.S. MEARS**  
SALES MANAGER  
STERLING MOTOR TRUCK CO. OF N.Y. INC.



A DENTIST ONCE WAS DR. MEARS,  
SO PRACTICAL WAS HE,  
THAT TEETH WERE PULLED TWO AT A TIME.  
BY POWER DON'T YOU SEE,  
THE EAR PHONE HE INVENTED,  
HAS ADDED TO HIS FAME,  
FOR A MAN LIKE HE TO LEAVE THOSE FIELDS  
SURE IS A CURSED SHAME  
BUT NOW HE HAS APPLIED HIS PULL  
AND KEEN EAR PHONE TO BIZZ,  
AND ORDERS FOR THE STERLING TRUCKS  
CROWD ORDER BOOKS OF HIS

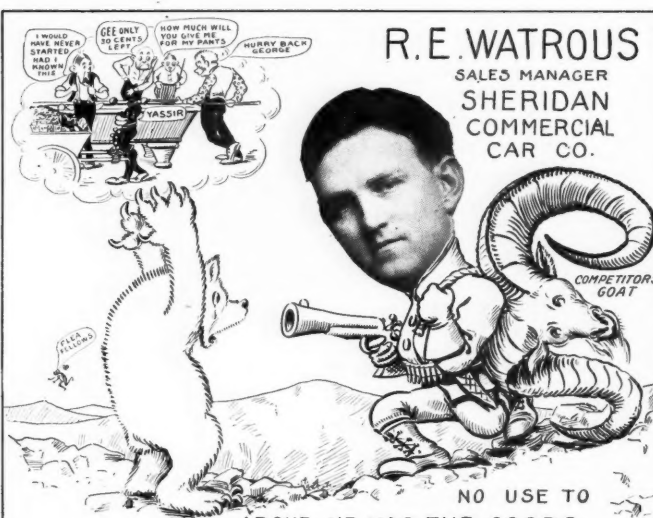
HE GETS THEM BY WIRELESS

**EDWARD A. CASSIDY**  
PRES. & SALES MANAGER  
EDWARD A. CASSIDY CO.  
NEW YORK



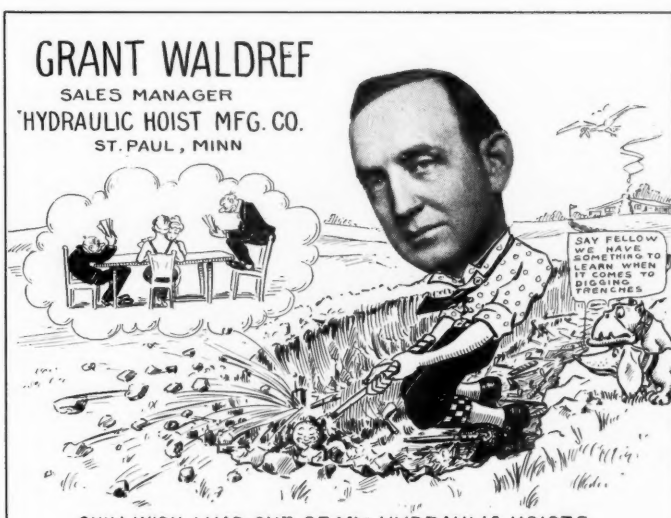
HE MAKES THE WORLD SIT UP AND TAKE NOTICE

**R.E. WATROUS**  
SALES MANAGER  
SHERIDAN COMMERCIAL CAR CO.



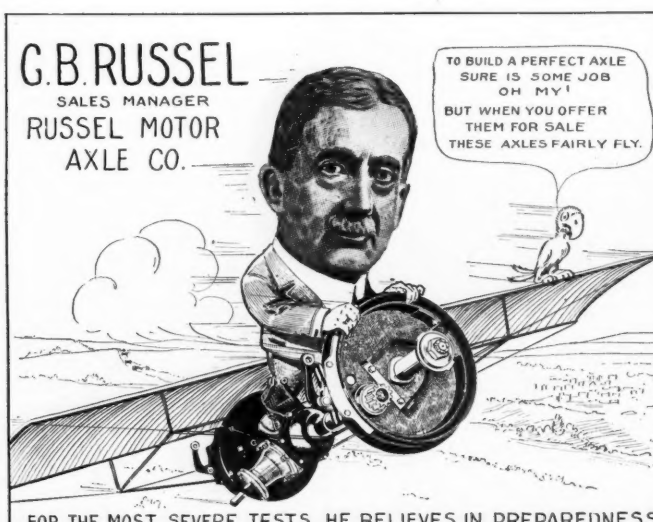
NO USE TO ARGUE, HE HAS THE GOODS

**GRANT WALDREF**  
SALES MANAGER  
HYDRAULIC HOIST MFG. CO.  
ST. PAUL, MINN.



ONLY WISH I HAD ONE OF MY HYDRAULIC HOISTS

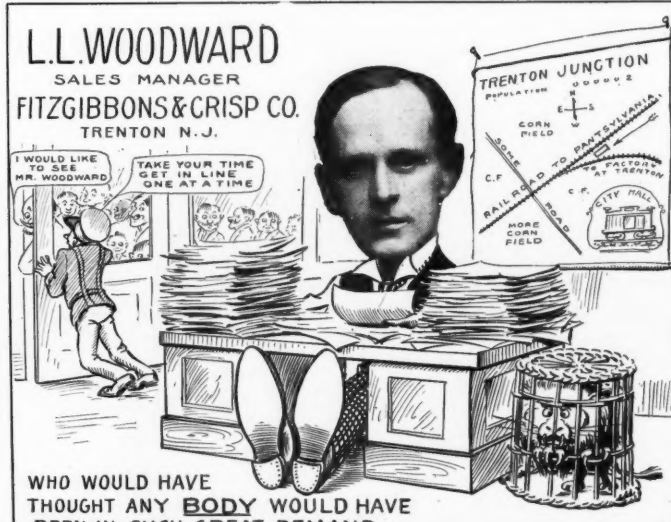
**G.B. RUSSEL**  
SALES MANAGER  
RUSSEL MOTOR AXLE CO.



TO BUILD A PERFECT AXLE  
SURE IS SOME JOB  
OH MY!  
BUT WHEN YOU OFFER  
THEM FOR SALE  
THESE AXLES FAIRLY FLY.

FOR THE MOST SEVERE TESTS, HE BELIEVES IN PREPAREDNESS

**L.L. WOODWARD**  
SALES MANAGER  
FITZGIBBONS & CRISP CO.  
TRENTON N.J.



WHO WOULD HAVE  
THOUGHT ANY BODY WOULD HAVE  
BEEN IN SUCH GREAT DEMAND

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!



# Compensating the Motor Car Salesmen

By CHARLES E. STONE



**P**ROBABLY no one single element of the motor truck merchandising problem is so perplexing as that of properly compensating salesmen. Many are the gray hairs that have developed during the years of study in an endeavor to reach a happy solution whereby both manufacturer or dealer and the salesman alike will participate equitably in the profit. Unfortunately at this time there are many manufacturers and a great many more agents coming into the field who lack both experience and knowledge as to the many trials and tribulations to be gone through before their organizations can be welded into a harmonious whole, unitedly striving toward the goal of success; to such in particular this brief résumé of the employment problem may be of value, due to lack of sufficient funds necessary to adopt a strictly commission basis of compensation. To date, just four methods are being employed in paying salesmen and they are here listed in the order in which satisfaction is mutually obtained by both parties.

- 1st. Salary and commission.
- 2d. Salary.
- 3rd. Commission with drawing account.
- 4th. Straight commission.

In conjunction with the first three methods it is usual to pay the reasonable expenses of the salesmen, though this is a matter depending largely upon the personal characteristics of the salesman, and the plan should be more or less elastic in its adoption in any one policy. Under certain circumstances it may be found desirable to adopt more than one of the foregoing methods of compensation, but any departure from a standard practice more often than not leads to friction and "feeling" within the sales organization, much to the detriment of the business. While we have listed the methods in the order in which they have proved their success during the past ten or twelve years, the present day desire on the part of manufacturers and agents alike seems to be to reverse the order, making the strictly commissions basis the one to adopt. This may be due to any one of the three following reasons: First, lack of capital; second, lack of knowledge and an effort to determine the best method with least expense; third, lack of information relative to qualified men.

## Start Commission

Inasmuch as before stated the straight course, the only one which can be considered, and in the fact that this plan eliminates the weekly payroll, alone represents to pay a salary of some sort, the straight commission form of compensation is, of commission basis seems to have the call, we will deal with it first of all, outlining its few advantages and many disadvantages in their order. Should there be a lack of funds to enable the manufacturer or dealer its desirability. Right here it should be thoroughly understood that you can not employ a man to sell trucks on straight commission, though you can commission

him or arrange with him to sell or handle your product on such a basis. He is not an employee, but what is generally termed a "free lance," or broker, and so recognized through the motor truck industry. As a matter of ethics, such brokers consider themselves duty bound to use every possible effort to sell the particular make of truck, but should they find themselves hopelessly out of the deal are free to arrange to place some other make. Unless the line is complete, the straight commission man is at full liberty to arrange with other builders to fill out his list of sizes; as a matter of fact, no one working under the straight commission plan can afford to tie up exclusively with one agent or manufacturer unless he will have all sizes of machines to handle. Over the straight commission man no control can be exercised; he is absolutely his own boss, privileged to go when and where he pleases, although he has been in the habit of making out daily reports of his calls to the firm with whom he makes his headquarters, he is not compelled to do so as all such reports are his own property; by law they cannot be assigned by the sales manager to others without his expressed permission, and should the selling arrangement be terminated, the salesman can demand and secure all of such reports before leaving. Unfortunately, those in the truck business do not understand this phase of the situation and have often accused men of "double dealings" when in reality they were well within their own rights. Under some conditions, the agent can further be made to pay commission to the "free lance" on repeat order business, long after he may have retired from the field. Summed up, this plan offers but one advantage—the payment of money only after it has been earned. Against that, however, the dealer has no salesman whom he may direct or supervise, owns no list of prospects and cannot build for any great future. Unless the salesman has sufficient reserve capital to last or rather carry him for a considerable time, a year at least, and is able to arrange to sell on a basis of not less than 10 per cent., which is about double that now offered, this plan of selling will result in failure. To the consumer, the scheme is one of the best; he receives more attention from the "free lance" than an employed man and inasmuch as he is dealing rather with the man than the company, does not find himself deserted in the event of a change of business interests.

## Commission With Drawing Account

The third method of compensating salesmen, that of allowing a drawing account against commissions to be earned, overcomes some of the drawbacks connected with the straight commission plan. The salesman is no longer a "free lance" and becomes to a large degree an employee, who may be dictated to and directed in his work, who can be required to turn in reports which may be retained, who can be required to represent the one line and concern only, who advertises the truck and

company he works for in place of his services as an expert, who is in a better position to serve the customer than an employed man, and, lastly, he may be discharged.

Against these many advantages, from the agent's point of view, is alone the question of a weekly payroll; but it might be said right here, that anyone engaging in the manufacture or sale of trucks who cannot afford to employ and pay the proper sales organization had better remain without the ranks. With commission and drawing account the salesman can work to far better advantage; his mind is not constantly worried by the ever-present thought as to how he is going to meet his weekly expenses and the rent. By concentrating upon one make of vehicle he ultimately arrives at better results than where the necessity of turning a deal requires the talking of several makes of machines. Again, not being his own boss prevents him from taking things easy after a successful campaign—he must report to the sales manager, who cannot see the taking in of baseball games and automobile races.

In the employment of the commission plan of compensation, backed by a drawing account, there is for some peculiar reason a tendency to pay a less rate of commission than where no drawing account is involved. If 10 per cent. is allowable, where it is payable only when earned, then why not when a drawing account is involved? Certainly there is less likelihood of the salesman being indebted to the firm and therefore far better feeling in the sales organization.

## Straight Salary

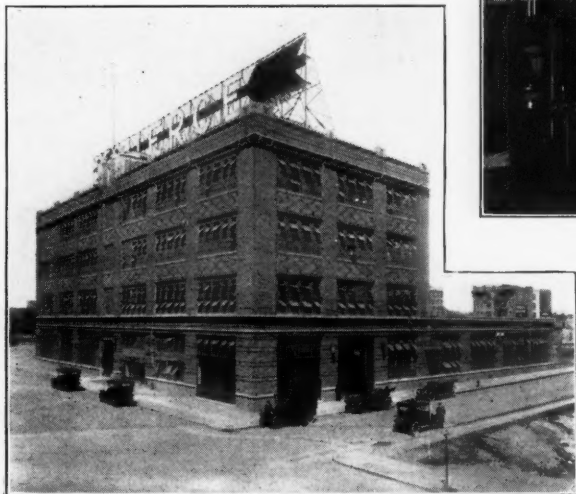
Plan No. 2, straight salary, offers greater freedom of mind from worry and therefore greater concentration upon sales work. Of course, both of them must be earned, otherwise the arrangement will in time be canceled. There seems to be a different feeling experienced by the average man between working for a salary or a drawing account, though in reality they are much alike, with the actual advantage in favor of the drawing account, as it is then up to the salesman himself to increase his salary. Under the salary plan, it is a matter resting entirely with his employer; however, the fact that we find men working better under the salary plan in the truck business places it above the commission and drawing account method of compensation. The salary plan, as a rule, means greater profit to the agent than commission and drawing account, as with the right type of salesman we find their weekly salary averaging less than the returns under the commission scheme. There is further a greater hold upon the men, particularly when they have been sufficiently long with the concern to have the amount of commissions due on the books exceed the amount drawn. The consumers also rather patronize agents who pay salaries rather than commission, as they believe there is less probability of

changes being made, and therefore they receive the same amount of personal interest from the salesman year after year.

### Salary and Commission

We now reach plan No. 1, calling for the really ideal arrangement for every one concerned. To the employer it varies little in actual results from a monetary point of view from the commission arrangement with a drawing account, but holds quite a different position in the minds of the sales force. The success attending the straight salary plan is greatly enhanced by the automatic increase in pay due to increased sales as a result of greater effort and concentration. A canvass of the real old-timers in the industry conclusively proves this method superior from all angles than any other.

Several times in the foregoing article I have mentioned the mental worry to which the motor truck salesman is subjected. It is absolutely essential that money troubles should not handicap the salesman in his work. Give the salesman a contract which will protect him for a reasonable length of time—a year is not excessive—and there will then be less criticism heard regarding the lack of good motor truck salesmen. One of the very best men now in the business—a man making a great record for himself—was at first for ever eight months at a salary of \$40 a week and expenses before making a sale of any description. Had the man been dropped during this period, as he surely would have by the majority of those in the business, a monetary loss would have been experienced and probably the industry would have been without his services to-day.



Pierce-Arrow New York Service Station

### KELLY-SPRINGFIELD TIRE COMPANY SHOWS BIG PROFITS

Kelly-Springfield Tire Co., Akron, Ohio, in its annual report shows gross profits of \$2,880,080. The total net income for the year, consisting of the net operating income, with other income, amounts to \$1,706,744, as compared with \$1,231,620 for 1914. Since 1914 the second preferred stock has been reduced by \$834,600 and the common stock increased by \$834,000. In 1915 the sinking fund received about \$91,000 additional and a reserve for bonus of \$70,674 was created.

### MAINTAINS CAREFUL INSPECTION OF TRUCKS IN USE

By C. P. SHATTUCK

WITH the development of the truck industry it was but natural that agents of companies manufacturing pleasure cars should take on the line of commercial cars produced by the factory. The Harrolds Motor Car Co., 233, 239 West 54th Street, is an example, and Robert C. Reid, manager of the truck department stated that not only was he making many sales, but conditions are growing better every day. The company has been handling Pierce-Arrow trucks for about three years, and covers Greater New York, Long Island, certain counties in the State and a section of Connecticut.

Competition is naturally very keen in New York City, as practically every make of commercial car is represented. In speaking of what is termed a difficult sale: that is, where the customer is apparently undecided, Mr. Reid stated that the reputation of the truck and the company in back of it were factors. This is proven, he says, by the customer buying again after six months' use. Many prospects display shrewdness in investigating the claims of the other salesman, such as fuel, etc. Invariably a thorough investigation by the

four-story service building at Long Island City. It comprises four stories and an extension, the latter being utilized for radiator repairs, brazing and welding, and it also houses the forge department. The main building is 200 ft. square and buildings provide 106,911 sq. ft. The building is departmentized, and access to the upper floors is by an elevator 13x30 ft., having a capacity of 20,000 lbs. It is stated that it is the largest elevator in the city.

Some idea may be obtained as to the equipment by the statement of Mr. Reid that the power driven machine tools represent an investment of \$52,000 and that 165 mechanics are employed. Over \$14,000 worth of parts are stored, and the entire equipment represents an expenditure of nearly \$150,000. The time and labor saving equipment and machinery includes a press especially constructed for removing and replacing tires which is shown in an accompanying illustration. The facts are mentioned to show how the users of Pierce-Arrow trucks are taken care of and exemplifies the service policy of the company. In addition, the company maintains a fleet of trucks to replace any that may meet with an accident and those being overhauled.

Mr. Reid believes that it is not the price that sells the truck, but its quality, that



Interior of Pierce-Arrow Service Station

prospect of the unwarranted claims is injurious to the salesman of the company.

The truck department of the Harrolds Motor Car Co., has at its disposal complete tabulation, showing the cost of operating and maintaining its trucks in different lines of business, and can make special analysis,

when it is necessary, of any transportation problem. This branch of the truck department has been highly developed, but Mr. Reid stated that very few prospects took advantage of it. Four men, however, are kept busy routing, making adjustments and suggestions, watching the loads transported; in fact, these service men have a habit of appearing when the driver or owner of the trucks least expect them. The company interprets service to mean that it is responsible for the successful operation of its trucks, and in addition to the inspectors, maintains a

the purchaser of a high grade truck is a discerning buyer, much more so than a man who has limited his cost to \$1000. Relative to the cost of horse-drawn equipment versus the truck, Mr. Reid said he would like to talk facts and figures, but unfortunately the owner of horses does not know what they cost him to operate and maintain.

The Harrolds Motor Car Co. utilizes a conventional system for obtaining and following up its leads, employing a card index method which is universally used by dealers. Its salesmen are carefully trained, capable of analyzing transportation problems and have at their command figures to show the operating and maintenance costs of the different capacity trucks for any given number of horse-drawn equipments and for any mileage. As with other merchandizers of commercial cars on New York City, the Harrolds Motor Car Co. owes its success to business methods in disposing and maintaining the product of a factory with a reputation.

The CCJ has most advertisers because it gives them biggest returns



# Commercial Cars in Drayage Business Boost Profits

## Trucks Increase Revenue of Drayage Companies and Open Up New Fields for the Merchant

By A. A. WILLOUGHBY



**T**HAT the contract hauling business for the large furniture and piano houses is a profitable field for motor trucking companies has been amply proven in the case of the Crescent Motor Drayage Company of San Francisco. This company which is one of the earliest in this field in this class of work, operates at present a fleet of sixteen trucks with prospects of a large increase the coming spring. While the costs of deliveries are practically the same as with teams, the large increase of territory which is made accessible through the use of the motor truck and the resultant potential sales possibilities brings the truck into prominence as an active factor in the growth of a retail business.

In the case of one large furniture house, the field covered by regular deliveries has been tripled over that covered by the horse-drawn equipment while the additional population brought into touch with the house salesmen has been at least doubled. In the handling of a retail business, the efficiency of the delivery service largely determines the ultimate growth of the firm's business. To increase the population which is tributary to the business house from half a million to that of a million through the introduction of the commercial car into the delivery end of the business, is a vital factor and one well worth considering. The truck in parcel delivery service particularly has been slow in coming into use in and about San Francisco and it is only within the past few months that the large retail houses have been discarding their horse equipment.

The fleet of trucks in service of the Crescent company comprises nine Federals, five Gramms, one Packard and one Wilcox. The firm commenced active operations in 1912 with two 1-ton Gramm trucks. These were used in the daily paper service in getting special editions to the newsboys in scattered parts of the city. The venture proved so successful from its inception that a third truck was placed in the furniture

delivery service six weeks later, followed by a truck placed in service for a piano house. Additions to the fleet have been regularly made until now this company is one of the largest truck owners on the coast.

The first entrance in furniture hauling came with the trial made by the D. N. & E. Walters Company of San Francisco, one of the largest houses on the coast. The truck was given a two months' trial in competition with the eight to ten teams with the result that during the third month, all the teams were withdrawn and three more trucks added. The regular fleet has since been maintained with special trucks as necessary to handle heavy business at certain portions of the year. At times there are as many as eight or nine trucks in use by this company.

For purposes of systematizing the work, the city had been laid out for the teams into four districts, roughly as follows: District one comprising all the territory north of Market and Sutter Streets from the water front as far west as Fillmore Street; district two, from Fillmore Street west to the Beach and north from Golden Gate Park; district three, the Sunset section south from the Park and west of Twin Peaks; district four the Mission including the territory south of Market Street and east of Twin Peaks. But one regular trip a day was provided by the teams. Those returning early were given pick-up runs close in. In view of the general hill condition of San Francisco, one trip was the most that could be expected on a great many of the runs. With the introduction of the motor truck, the same territory grouping was followed out, but two regular deliveries were scheduled in place of the one previously given, giving a double service. Formerly two teams were sent across the bay twice a week for the suburban territory that was close in, but the radius covered was comparatively small. Practically all of the east bay territory having a population in excess of 150,000 has been made as accessible through truck delivery

as San Francisco itself. As many as four trips a week are made.

The greatest extension of the service has been southward down the peninsula, where exists a population of probably 300,000 adjacent to the main traveled highways. The truck which is used in the east bay territory is also used for regular trips down the peninsula as far as Redwood City, 25 miles distant. San Jose, 50 miles distant from San Francisco is easily covered, owing to the splendid asphalt surfaced highways prevailing.

The method of delivery is as follows: Four trucks are sent to the store each morning. A traffic manager is employed by the store who does nothing else but sort out the material to be delivered and arranges the loads according to the districts. A helper is sent out with the driver. As many more trucks are available from the drayage company as may be called for above the regular number during rush seasons. At times eight and nine trucks have been in use. This assures a happy medium for the furniture company as it assures them of enough trucks at all times to take care of their delivery business expeditiously and yet does not tie them up with trucks not actually needed. A regular loading platform flush with the truck body is used.

The cost to the furniture company of the motor truck for delivery service is substantially the same as for the horse-drawn equipment yet taking into consideration the doubling of the population tributary to the store's activities has actually greatly reduced the delivery cost, and made possible the enlarging of the sales system of the store to a great extent. The regular trucks furnished the store are lettered with the firm name. The illustration shows the type of truck body used in the furniture service, the body being 6 ft. wide and 12 ft. long and having extra deep side panels 21 in.

In the case of another furniture company, three trucks from as many companies have displaced seven teams. Practically the same routing is followed out as with the



Fleet of Machines Used by the D. N. & E. Walter Company, of San Francisco, Cal.

The CCJ leads in circulation, advertising and prestige

Walters company. The Crescent company furnishes one of the trucks.

Two trucks are regularly used for piano hauling. While one truck is lettered with a customer's name, panels are provided to cover the name when doing custom work at other times. The body which has the same dimensions as that used in the furniture service, it will easily accommodate five pianos at one load.

The American Express Company which recently entered the local field, has contracted with this company to furnish from one to three trucks to take care of their business in preference to putting in their own equipment. The Standard Biscuit Company, a local concern has recently closed a five-year contract, using as initial equipment one truck displacing two teams and is figuring on using more trucks.

The regular contract offered by the drayage company provides for the steady use of a truck and driver for a specified period with the privilege of special trucks as occasion may require. Under average conditions the cost to the user is figured at \$265 per month which includes the use of the truck 10 hours per day with driver, all materials and repairs being furnished by the drayage company. This amount varies as regards the conditions of use but it may be taken as an average price. Figured on the basis of what a team would cost which could conservatively be placed at \$175 per month, the great resultant saving in the use of the motor truck is plainly apparent.

#### Garaging

The company operates its own garage, the building being 70 ft. by 166 ft. in size and capable of accommodating eighty cars. A force of mechanics is regularly maintained to handle the repair work on the cars as with the large number under regular contract, it is essential that they be kept in constant service. The drivers are required to keep their cars supplied with gasoline and oil and the grease cups filled but are not permitted to do any repair work. All troubles must be reported promptly to the shop foreman. All the body work and blacksmithing is done in the shop of William Roberts immediately adjoining so that the entire plant is practically under one roof.

The fact that the rainy season which ordinarily lasts but four months of the year and requires the use of a top regularly but about three weeks of that time, makes it imperative to provide storage room for the tops. A unique system has been devised by utilizing the steel roof trusses to carry the pulley slings for supporting the tops when not in use. Through the use of four removable stanchions made of 1½ in. pipe, the top is easily lifted from the body and as easily placed in position when necessary. Each truck is provided with a top. A home-made revolving steel frame derrick for lifting out the motor assemblies and making them readily accessible, is used. An ample supply of repair parts is carried in stock at all times.

The cost of operating a truck in this class of service, figuring an average daily mileage of forty, is estimated at \$8 per day on a ton and a half truck, including administration expenses, driver's salary, repairs,

gasoline, oils, greases, taxes, licenses, insurance and depreciation. This figure appears to be a low one but the fact remains that the company is one of the oldest in the city and having been unusually successful in keeping a large fleet in service with but minor interruptions, has proven this from their own experience.

#### AN UNIQUE SELLING METHOD FOR USED TRUCKS AND PLEASURE CARS

Selling used trucks and pleasure cars in a capacious room with a demonstrating road an eighth of a mile around, is the unique method employed by an enterprising Los Angeles dealer. For that purpose a lot opposite the Washington ball park was leased, the grounds usually occupied by the circus, and on it was pitched a real circus tent 400 ft. long and 200 ft. wide. Under this "big top," as the showman terms it, there is display space for five hundred machines and five thousand prospects can view the trucks, pleasure vehicles and delivery cars on sale.

Without leaving the tent, the salesman can take the prospect on a test ride, for a track that has eight laps to the mile is fairly well adapted to showing off a car. Besides the elliptical course, there is an artificial hill, with a grade of 20 per cent., on which the machine is run to show what it can do on an incline.

A dozen salesmen are kept busy here all the time, for private sales are in order constantly, and in addition to that there is a big auction every Tuesday and Saturday. This draws the crowds, of course, and the selling is brisk. It is customary to show off the machine on the track before putting it under the hammer, then it is tried out on the incline and finally it is exposed on a platform, where everyone in the tent can

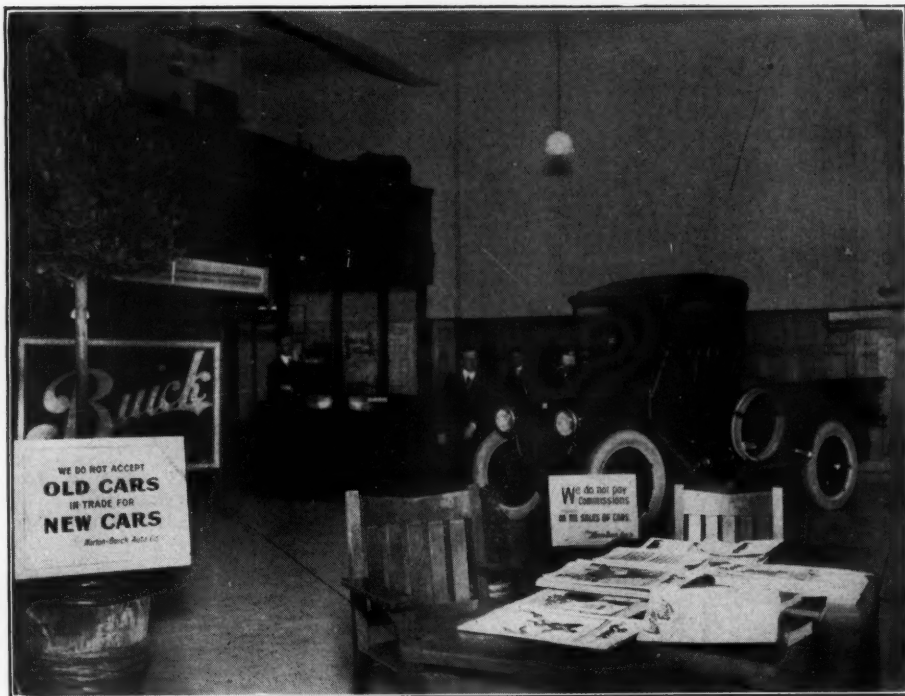
see it plainly. Then the auctioneer uses his eloquence to good effect.

One of the commonest transactions in Western motor dealing is the exchange of used cars or trucks for real estate or diamonds. In fact, many auto dealers in the West are experienced realty men and diamond experts, so to meet this demand, an exchange bureau for gems and lots has been established in the big tent. To indicate the demand for this service it may be stated that a short time after the business had been established, there were listings of eight hundred lots on file in the canvas salesroom, and fifteen diamonds reposed in its safe. And trucks, light commercial cars and pleasure vehicles from runabout to limousines were lined up on the sawdust by the score and hundred.

A fee of \$1 a week is charged to enter the car in the tent, which includes entry in the twice-weekly auction if desired. The commission is 5 per cent. on straight sales and 2 per cent. for sales by competitive bidding. In the first two weeks that the business was operating, twenty machines were auctioned off, thirty-one were sold privately and 148 cars had been received for private sale.

Some large auto agencies have seen the advantage of this proposition, and in order to keep their used car department separate from the regular business, they have adopted the practice of handling their traded-in machines in the tent.

Dealers welcome the method, as it affords a quick outlet for used cars, and the public is encouraged to sell the old machine for cash and in turn secure the advantage of cash discounts in buying new motors. As one agent expressed it: "The cash buyer is the one who makes the dealer happy, and he is the one who is most likely to be happy himself, because he knows that he has made the best buy possible."



Denver Buick Sales Room

Signs prominently displayed tell the customer that no second-hand cars are traded in and that no commissions are paid on sales of cars

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers





## Motor Truck Design and Construction Made Plain Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is a series of articles by this well-known writer, covering in a non-technical way, the various constructions now current practice in commercial car design. Preceding articles covered General Types of Chassis, Two and Four-Cycle Engines, Types of Cylinders and Their Parts, The Valve-Operating Mechanism and the Crankcase, Engine Lubrication, The Engine Cooling System, Carburetion and Carburetors, High-Tension Magnetos, Low-Tension Magnetos and Battery Systems, Inductor Magnetos, Governors and Speed-Controlling Devices, Clutches, Unusual Features of Design, Transmissions, The Universal Joint and Differential, The Final Drive, Front and Four-Wheel Drives, Brakes, The Front Axle, The Steering Gear, The Frame, Power Plant Arrangement and Its Mounting, Springs and Suspension.

### PART XXI

#### MOTOR TRUCK WHEELS

**R**OAD shocks must first be taken by the road wheels, through tire contact, and thence distributed, spreading out in all directions from the hubs of the wheels.

There are essentially three types of wheels used on motor trucks at present: wood wheels of the artillery type which are used on a great number of machines, pressed steel and cast steel wheels.

#### Artillery Wood Wheels

The artillery type of wheel consists of a set of spokes turned from very tough wood, generally second growth hickory, which are clamped at their inner end between flanges on a metal hub and at their outer end tenoned into a wooden felloe, which is surrounded by a steel band or ring. The spokes may be either of elliptic, square or rectangular section, and great care is taken to get the fiber to run exactly in the direction of the spoke length. It is common practice to split the spoke billets instead of sawing them.

The wood used in the spokes and felloes is made from well seasoned timber, so that strength and toughness in the highest degree can be obtained. Second growth stock and stock from the lower portion of small trees yields the best parts.

In truck work when solid tires are used the spokes are of square or rectangular section, since these are stronger in proportion to weight than the elliptic spoke.

The greatest amount of trouble with the artillery wheel has been experienced with those used on very heavy trucks. The spokes are very thick and a comparatively slight shrinkage of the spoke causes them to loosen in their hub and the severe jarring, due to the use of solid tires, then has a very destructive action. In order to deviate this difficulty and strengthen the spokes assembly at the center the Schwartz Wheel Co. make the miter of the spokes interlocking, while other makers provide keys between the miters or adjacent spokes.

#### Steel Wheels

Cast steel wheels are now gradually coming into use, while pressed steel wheels are also used on some of the vehicles having less than two tons capacity. The steel wheel is very popular in foreign countries, and American manufacturers are gradually using them. In some cases they have not succeeded, while in others they have given excellent service, which is also true of the wood wheel.

The advantages pos-

sessed by the steel wheel for heavy duty are strength, true shape, rigidity, concentricity of the hub and accurate design for

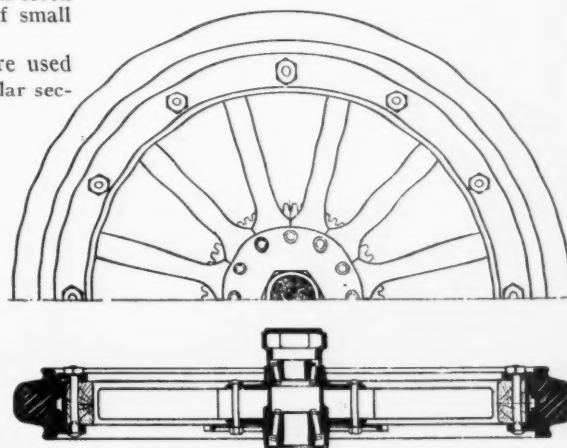


Fig. 1. Natco Front Wheel

This wheel has twelve square spokes which are turned into the felloe and retained in the hub by twelve bolts.

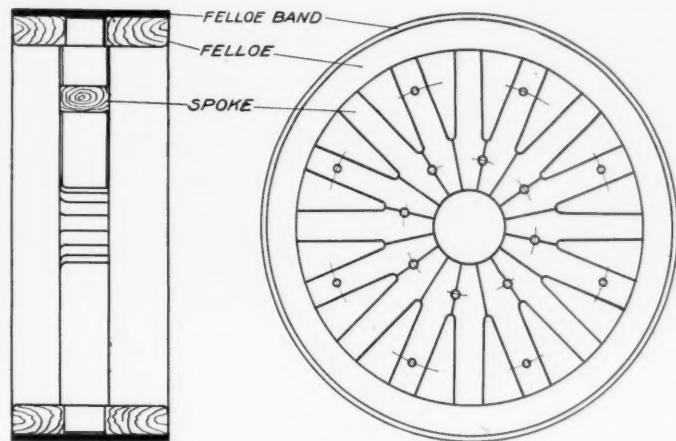


Fig. 2. Spoke, Felloe and Felloe Band Assembly

Assembly of wood wheel for 40 x 7 in. dual tires. There are eight spokes of rectangular section and eight spokes of square section

the support of the load. In point of strength and elastic limit, the steel wheel, well made, is superior to the wood wheel, and will sustain more in impact and side thrust. Another advantage is that they may be accurately machined, and once round, they will stay so regardless of humidity, heat, etc., that affect most wood wheels. In design these wheels may have the brake drum, hub and flange cast integral so that there are no bolts and rivets to loosen or break. Considering weight, for vehicles of 3 tons capacity and over, the steel wheel is lighter than a wood wheel of equal strength, while for 2-ton vehicles both types are about equal in weight.

The pressed steel type of wheel for trucks up to 2 tons capacity is somewhat lighter in weight than a wooden wheel of corresponding capacity. This type of wheel can be produced for practically the same price as wood wheels, when the complete wheel is considered.

The steel wheels vary in construction, and opinions differ as to which construction gives the best service.

An idea of the construction of wood and steel wheels can be obtained from the illustrations presented herewith and the descriptions which follow:

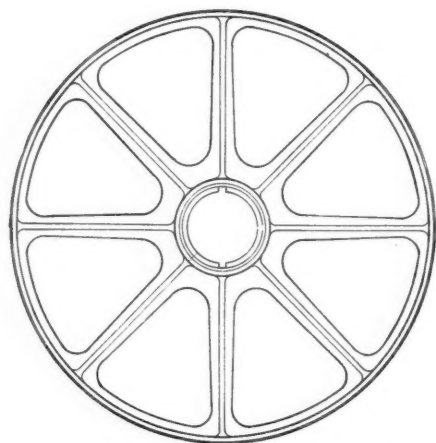
Fig. 1 illustrates the Natco 1-ton front wheel with demountable tire. The wheel has twelve square spokes which are turned into the felloe and retained in the hub by twelve bolts placed between adjacent spokes. The general form of the hubs is largely determined by the dimensions of the bearings and their necessary distance apart. One hub flange is generally made integral with the hub casting, while the other is free to be slipped over a machined cylindrical surface so as to be accurately guided.

Fig. 2 depicts the construction of the Mogul 6-ton rear wheel which is equipped with 40x7 in. S.A.E. tires. There are eight spokes of rectangular section and eight spokes of square section. These are all of the same thickness, but the rectangular ones are used for attaching the brake drum, and have practically the same strength as the square spokes, as considerable stock is removed by the bolt holes. The hub bolts pass through the miter joints of adjacent spokes as shown. The felloe is made to S.A.E. dimensions, and the S.A.E. felloe band is shrunk over it.

Cast steel wheels may be either of the spoke or disc type, and both seem to be giving good results. The disc type either have a single or a double disc, depending upon the capacity, while the spoke type may have either tubular or cross section spokes.

The single disc type is at present being used on the Jeffrey Quad trucks, and this application is clearly shown in Fig. 3. The essential features of this type of wheel are a cast hollow box section rim supported by a curved spring-like section to struts connecting with the hub. The disc includes a solid cast brake drum and container for the driving mechanism. The working parts of the drive are thoroughly protected from injury by the wheel disc and brake drum. It will be noted that the hub is cast integral and that there are no bolts or nuts to loosen except those which retain the internal gear.

The double disc type for heavier vehicles is shown in Fig. 4. The hub and brake

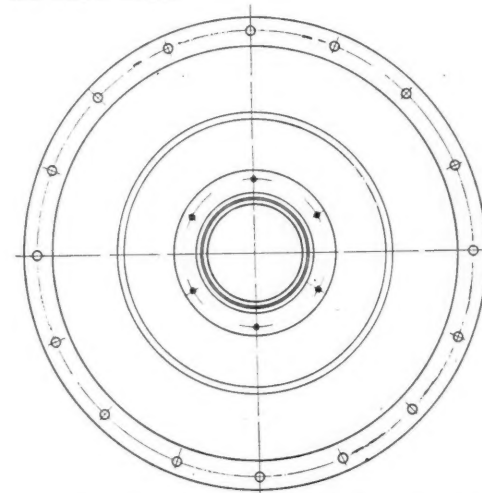


**Fig. 5. Spoke Type Cast-Steel Front Wheel**  
There are eight spokes, thoroughly ribbed and filleted to obtain the greatest possible strength with minimum weight

drum are cast integral, while the resiliency is obtained through a wide curvature of both discs. The rim is also of box like section, however, the discs extend to the hub instead of forming a strut at the bottom.

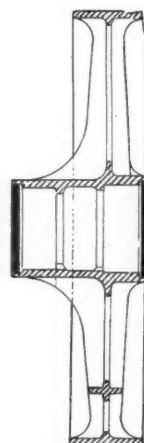
Fig. 5 depicts a spoke type of front wheel with integral hub and rim. There are eight spokes of cross section thoroughly ribbed and filleted to obtain the greatest possible strength with minimum weight.

Fig. 6 shows this type of rear wheel; however, the spokes are of Y shape, which affords a greater number of supports to the wheel rim without increasing weight, and enables the driving stresses and road shocks to be more equally distributed over the whole wheel.



**Fig. 4. Buchanan Cast Rear Wheel for Dual Tires**  
The hub and brake drum are cast integral, while the resiliency is obtained through a wide curvature of both discs

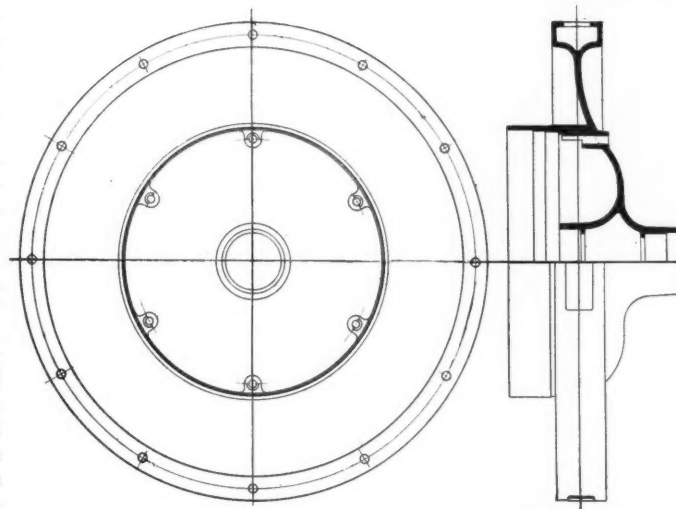
Fig. 7 illustrates the hollow spoke type of wheel. These spokes are of tubular section and are connected to the rim by large fillets.



The hub is cast integral, while the brake drum may be cast integral or bolted to this type of wheel.

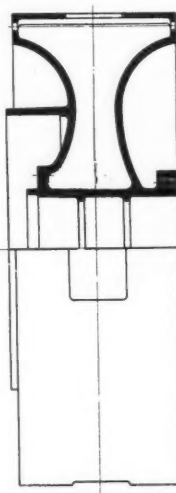
Efforts to decrease the weight of steel wheels for vehicles under 2 tons capacity, has led to the building of wheels having the disc and lighter sections of the wheel made of pressed steel, rigidly connected to cast steel hubs.

This construction is shown in Fig. 8. The construction is similar to the cast wheels mentioned above with a box type hollow rim, except that the discs



**Fig. 3. Jeffery Quad Cast-Steel Wheel**  
With integral brake drum and hub. This wheel is of the single-disc type. There are no bolts or nuts except those which retain the internal gear.

are flanged a little deeper at the rim to form a wider box section. The cast flange of the hub is carried out further to carry the brake drum and the driving mechanism.

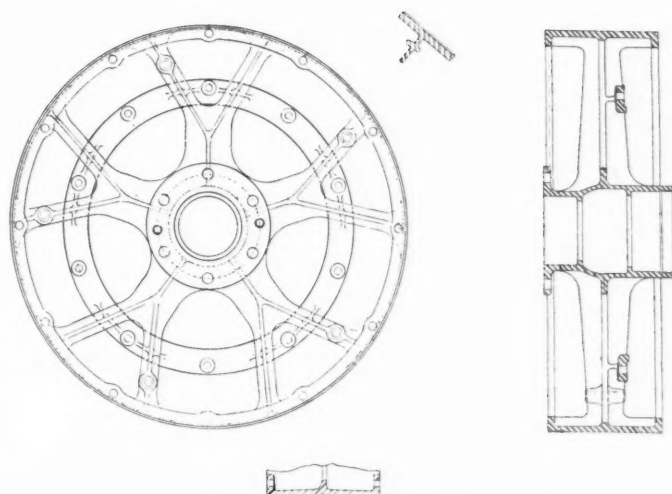


Wheel construction seems to be one of the principal problems on which manufacturers do not agree. The wheels on large capacity vehicles to-day are called upon to carry a very heavy burden at higher speed than ever, and they must also stand the strain due to transmission of power. In order to meet these conditions, the proportions of spokes and felloes have been materially increased, and following the precedent of Europe, cast steel wheels are being considered.

Some advantages of the cast wheel have been outlined above, while of course it possesses certain disadvantages. However, the steel wheel can not be altered for different types and sizes of tires as easily as a wood wheel and a spoke in a wooden wheel, if broken can be replaced; but in this event the entire steel wheel would have to be replaced. Castings are always liable to flaws and blow holes and it is difficult to secure homogeneous metal free from hard spots. Unequal sections cause local variations in strength and internal stresses due to shrinkage in moulding. Where numerous cores are used in moulding, it is difficult to anchor these so that a uniform thickness of metal can be obtained. Strains due to shrinkage can be eliminated to some extent by heat treating. The principal argument against this wheel is that under severe service it crystallizes; however, the design of this type of wheel is of such nature that this so-called difficulty has never existed.

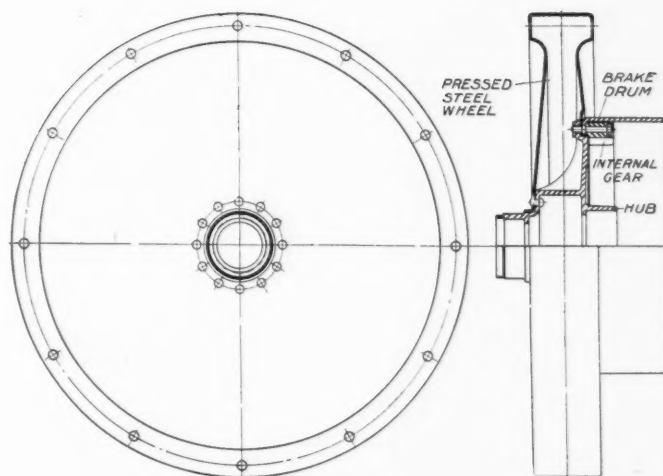
A steel wheel is made in one piece and can be arranged to have an integral brake





**Fig. 6. Spoke Type of Cast-Steel Rear Wheel**

These spokes are of Y shape which affords a greater number of supports to the wheel rim without increasing weight



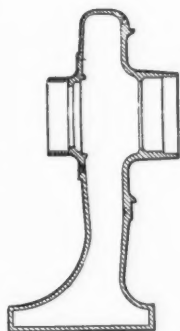
**Fig. 8. Pressed-Steel Rear Wheel for Internal-Gear Drive**

The construction is similar to the cast wheels, except that the discs are flanged a little deeper at the rim to form a wider box section

drum, hub and flange, and there is no opportunity for any working of the various joints. The very nature of this type of wheel adapts it wonderfully to the transmission of power, as the strength lies in the very points where the driving strains are centered.

The absolute concentricity of the hub, sprocket and flange assist greatly in the economical and efficient transmission of power, for with no high and low spots, there is no alternate tightening and loosening of the chain. In shaft-driven vehicles this condition is even more important.

Steel wheels also possess considerable advantage in carrying dual tires. In the case of offset felloes, the outer tire is entirely unsupported by the spokes; however, in this case, the steel wheel is particularly valuable, as the felloe can be so designed that the strains on the outer part can be successively transmitted to the spokes or discs



**Fig. 7. Hollow-Spoke Type Rear Wheel**

These spokes are of tubular section and are connected to the rim by large fillets

without any danger to the wheel itself.

Another feature is the decreased weight at the rim which permits more rapid acceleration.

The advantage of obtaining wheels all

assembled and complete for mounting is considerable. No division of responsibility exists as to the mounting of wheels on hubs, brake drums, etc.

Cast steel or pressed steel wheels can be and are made today at figures competitive with wood wheels. If the demand increases and they are ordered in large quantities, the cost will decrease. In considering cost it should be remembered that the steel wheel has the hub integral, and the rear wheel may also have the brake drum integral, and the cost of these together with all bolts, nuts, felloe band and the labor of fitting them must be added to the wood wheel to get a comparison in price.

From present indications it appears as though the steel wheel will shortly replace the wood wheel on at least the heavy vehicles. The demand is continually increasing, and quite a number of commercial car builders are experimenting with steel wheels.

## LONG CONTRACTS WOULD LEAD TO INCREASED ACTIVITY BY RESPONSIBLE DEALERS

According to one Western dealer who was interviewed by a representative of the COMMERCIAL CAR JOURNAL, the short contract may work harm to a dealer whose factory overestimates the market for its product in his locality. He thinks manufacturers' contracts should run from three to five years. A dealer spends money in local advertising, building good will, which is inevitably attached to the truck, and which is lost if he shifts his agency. The local man who pirates the business by taking a larger contract may not make good, and the second year the factory has to seek a third new dealer, losing again the momentum of previous sales activities, so both the factory

and the dealers are losers at every change.

"Factories should consign enough cars, but should not compel the dealer to pay for all cars the moment they arrive," says this dealer. "The dealer should pay the warehouse man for warehousing and advance freight but where his salesroom is full the balance of the shipment should be put in the warehouse subject to individual draft for each car.

"On trucks one-half of the repair parts should be furnished by the Western dealer on consignment. An agent in far Western territory must carry an enormous stock. Many of the parts are to be used for what should be classed as replacements. If they have to be secured from the factory it means tying up the vehicle from six to ten days, which means a loss to the owner, or

somebody, of income, or \$90 to \$120 required to hire a substitute truck. This is a special condition applying to the Pacific Coast.

"Trucks should be carried as nearly as possible interchangeable in different makes in parts requiring most frequent replacement. This will keep them from going to little machine shops, which very frequently supply parts cheaper than the factory, but which have not the wearing qualities and cause unsatisfactory, expensive service which is charged against the manufacturer by the user." The dealer making this point cites a case where a man having a part substituted in this way at a local machine shop had it give way and cause him \$50 loss for additional breakage before he got turned into the street.

The CCJ has most advertisers because it gives them biggest returns

## Western Distributer Prospers Without Trading in Second-Hand Trucks

By FRANK REED



**W**ILLIAM, E. BUSH, distributor of Pierce-Arrow touring cars and trucks in southern California, has handled the touring car line since 1905, and took on the trucks three years ago. He took on the truck business because he wanted it, but would not have taken any truck other than the Pierce-Arrow. He finds the truck business is working up the same as the touring car business did but considers that it will never be up to the touring car business. Among reasons for this he assigns what he terms the peculiar competitive conditions existing which permit trucks to be sold on time and make people think they have a right to make the dealer finance their business to the extent of supplying them with a truck on small payments down and the balance on an indefinite basis for the future.

The period of depression through which we have been passing, while obviously affecting about all business in southern California to a very great degree. Mr. Bush finds did not cut down his truck sales as badly as he anticipated when he saw that we were coming into such a period.

The demand for Pierce-Arrow trucks in the territory handled from Los Angeles is notably from outlying territory where they have to operate in sand and heat and severe grades. They are hauling electrical plant construction supplies over the desert and Sierra foothills for Kern River power development, ore in Arizona, oil in the various California fields, sand, gravel and crushed rock for State highway work. These sales have come to the distributor largely on the reputation of the truck. He finds that he cannot pioneer sales in the remote parts of his territory at a profit.

A good point in this distributor's relation with his factory, which he mentions, is that his manufacturer has never tried to force trucks on him. This has never put him in the position of being tempted to retaliate by passing the trucks on to persons who were not in a position to use the particular size of truck he had on hand, or in other ways force the market in a manner detrimental to the business.

Pierce-Arrow pleasure car owners have come naturally to be purchasers of Pierce-Arrow trucks. Mr. Bush's first truck sale, for example, was to the Belridge Oil Co., of McKittrick, which owned Pierce-Arrow touring cars. This truck is still in service, carrying heavy duty loads through the desert sand.

The most difficult sale or group of sales was to people who wanted trucks for dump work, hauling sand and gravel. The worm drive was new to them and it was difficult to convey to them a clear understanding of its advantages. Mr. Bush gained their confidence and proved his point by explanation. That was the only thing to do, so he talked them into an understanding of it.

Another difficult sale was to the Hammond Lumber Co., which has bought five Pierce-Arrow trucks. The drivers of the Pierce-Arrow touring cars owned by members of the firm got busy with their employers and told them why they thought the trucks would make good, giving reasons from a mechanical standpoint which convinced the purchasers.

Analysis of the cost was the critical point which sold the Pierce-Arrow trucks to the Gilmore Oil Co. Bush showed Mr. Gilmore how he would save money by putting on the truck instead of horses. The first month after the replacement the oil company showed Mr. Bush its figures giving cost only \$4 more than he had estimated for the monthly running expense, and no doubt after the company had a little more experience it was able to reduce this cost. Another sale closed by analysis and comparison of records of trucks in service was the one to the Blinn Lumber Co. for replacement of trucks which had been tried and did not stand up in service. This was complicated by the fact that some of the trucks replaced were as high priced as the Pierce-Arrow and others were not.

"Trading trucks is a lot different from trading touring cars," says Mr. Bush. "Styles and models have a lot to do with touring car trading. A man who has the price will turn in a touring car that is a little out of style but has a lot of mileage to run, and is consequently salable at a good price to a less critical buyer; but the man who comes in to trade off a truck always has one which has been run as long as it would hold together. Mr. Bush doesn't do any truck trading; not a bit. He says if he did he could do more business but he could not make more money, and at that he has not lost much business that he would not rather see the other fellow take and worry about than to have it himself. Trading is in about the same class with doubtful term payments."

"Work night and day on a truck brought in for repairs" is the service motto of this establishment. Their object is to get it back into service quick and take an interest in the other fellow's business to this extent. This is a great foundation for repeat orders. As to the matter of a service car Mr. Bush points out that a dealer cannot afford to operate one until he has made enough sales to keep one busy. His customers don't seem to have much trouble with their trucks and he hasn't needed a service car yet. With the exception of one car smashed by the railroad he hasn't had one come into his shop for two months. By the time he gets some 300 to 500 trucks out, however, he considers that he will probably need a service car and says this is the point where a good second hand truck could be fitted up.

Answering the question on THE COMMERCIAL CAR JOURNAL's list in regard to

five methods, principles, or reasons to which the dealer attributes his success, Mr. Bush says he can give just one reason, "The service my trucks are giving." He has not gone after business by advertising in the ordinary way. The people who use his trucks are business men who know the kind of results they are obtaining and who have friends and wide acquaintance and a standing that makes their recommendation count heavily.

In regard to price Mr. Bush believes in a high-priced car that has the quality that makes it worth the price. He says this gets the good business. In regard to the question on value and commissions (No. 13), his factory is one that wants the dealer to do business and be a success. This means that he must have a good commission on each sale. Some manufacturers who are peddling their lines among dealers don't care what happens to the dealer provided they, the manufacturer, get the money. For himself Mr. Bush believes in handling one car exclusively. He would not consider taking on another truck. He does not want to take a chance in representing anybody else or handling any other product. He believes, however, in general that if a dealer is not having enough sales with a single truck he should take on another to broaden his line. Service has everything to do with a dealer's success with the line, Mr. Bush thinks. His success in the touring car business came from his rather pioneer attitude in this regard, at a time when a good many dealers thought the only thing a customer could have in mind when he came up to the door after paying for a car was to cuss the dealer out for something that had gone wrong. Bush found that if he gave the service he could go to the front door when a customer drove up, instead of dodging out the back door. They didn't have kicks, just wanted some little thing done, which he took care of and they became comeback customers. This same thing works out with the trucks. This year's service puts next year's commissions into a dealer's pocket. Bush keeps a high-priced mechanic who looks over every car at intervals free for one year and no bill ever goes out for his services. This man gets as good pay as a lot of salesmen and better than some and from a standpoint of results the money is better invested than the salaries of most salesmen.

Once the reputation of a truck is established in a territory the activity that gets the new business is in the two lines, giving the service which keeps the trucks operating at highest efficiency all the time, and sending out salesmen who will concentrate on real prospects, get them to investigate among present owners and find out in this way what the truck will actually do for them. It is necessary to talk quite a great deal along the lines of comparison of horse cost with truck economy.



## NOT NECESSARY TO TALK HORSE COSTS

By C. P. SHATTUCK

**T**HE Superior Motor Garage Co., 208-212 West 76th Street, is an example of improving the opportunity afforded the practical garageman to enter the commercial car field and achieve success in a large city like New York. While it is admitted that the methods employed in selling commercial cars differ radically from those utilized with pleasure cars, the mechanical experience obtained with the latter is the foundation for service, at least, this is the opinion of Louis K. Schwartz, manager of the company, representing the International Harvester and Bessemer trucks in New York City and Long Island. The company has been engaged in selling commercial cars for over four years and was early attracted by the big field and its stability. Mr. Schwartz is very optimistic as to the future of the mechanical transportation, particularly in his territory.

In discussing the subject of the average contract and its effect upon the small dealer or garageman about to take on a line of commercial cars, Mr. Schwartz suggested the elimination of the clause as to contracting for quantity, that relating to deposits on cars, and that no bill of lading be attached. He also advocates automatic renewals, from year to year, and the factory consigning established parts to the dealer to facilitate service.

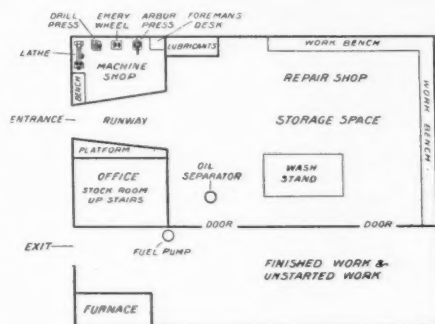
Mr. Schwartz does not believe in demonstrations. He believes that the business man interested in economical transportation can be convinced by the salesman, who is entirely familiar with the transportation problems of the prospect and can show him in figures the exact relative efficiency of the horse-drawn vehicle and the mechanical transport. It is rare that examples of concerns operating trucks under similar conditions cannot be shown to the satisfaction of the prospect. The salesmen daily make suggestions to a prospect, tending to improve the efficiency of his trucks. Special analysis is very common.

"I cannot say too much in favor of service to a user of our trucks," said Mr. Schwartz. "We have skilled workmen who can make an adjustment, locate a fault or complete an overhaul in the minimum of time. This coupled with the fact that we have a large and well-known company in back of us, has closed many a sale where competition was very keen. Our service, advertised through satisfied customers, has resulted in many repeat orders. I believe that the customer is entitled to the very best service, but that we are entitled to cash for all parts, and cash for unadjustable work, such as labor, etc. No misrepresentation by our salesmen and the use of good advertising mediums have contributed largely to our success. Night and day service is essential."

In the consideration of a line, Mr. Schwartz believes in a low priced vehicle and a popular priced truck up to 3 ton capacity. He further stated that it was seldom a salesman was obliged to talk the cost of horse delivery. Many leads are obtained from the factory and others in the conventional manner, especially

through customers. A card index system is employed and each prospect is followed up. The company does not believe in window displays or fancy advertising stunts as these do not pay.

The service station is on the ground floor, and as may be noted by the accompanying diagram, is provided with a one-way entrance and exit. It was formerly utilized by a large industrial concern for garaging its fleet of commercial cars, and both the offices and the foreman's room are



Plan of Service Station

so located that the heads of the company can keep in close touch with the workmen and operation of the garage. A large stock of spare parts is carried in a stockroom above the office and by means of a special system, parts are restocked in ample time. The machine shop is well equipped with time and labor-saving machinery, and the workmen are fitted to undertake the most difficult piece of work. Ample storage space is provided for customers, and these are segregated from the machines being repaired or overhauled by a partition, having two ample sized doors. A competent workman and a driver are on duty night and day to respond to hurry calls from customers who meet with accidents, etc.

## PACKARD BRANCH HAS ACCURATE COST FIGURES

By C. P. SHATTUCK

**T.** P. MYERS, manager of the truck department of the Packard Motor Car Co., of New York, considers business conditions are very good indeed and predicts prosperity for at least another year. The company maintains a large service station at Long Island City that can be reached by a motor vehicle in fifteen minutes, and every facility and convenience are provided for the users of Packard trucks. There are no half-way measures in the service afforded the Packard patrons, and an incident that occurred while the writer was at the offices of the company at Broadway and 61st Street, demonstrates the thoroughness of the service. A customer called up, asking if it would injure the motor to run it to the service station without a fan belt. Not only was the user instructed, but was informed that upon his arrival at the service station a man would be ready to fit another belt. The service station was called up by the office and the foreman notified as to the needed repair and the probable time of the arrival of the car.

Mr. Myers in speaking of the part service played in the sales and maintenance of Packard trucks said that the public generally has a misconception as to what constitutes service. It is the policy of the company to provide every facility and to supply the customers' needs at a reasonable charge, but not to give away labor or material. "Service may be compared to a well-equipped merchant carrying a fine and complete line of goods," said Mr. Myers. "His business is established and maintained for the benefit of his customers. Service is supplementary to the sales of trucks and not for profit. It is simply to supply the needs of the customer. It is surprising to note the lack of understanding on service. The customer generally remembers mishaps but is apt to forget the high grade and efficient service. He is not educated to appreciate what he is getting."

It is not necessary to talk the cost of horse delivery in New York City, but in some localities where contracts are made for teaming the Packard Co. finds it necessary to make comparisons. Mr. Myers has just completed a compilation of figures showing the cost of operating and maintaining Packard trucks of various capacities, and the tables enable a salesman to give instantly to a prospect accurate data. So complete are the figures that the cost of a daily mileage from ten upward can be given to the fraction of a cent, either with or without insurance. The items include fuel, oil, greases, tires, depreciation, repairs, garage, etc. The figures, unfortunately, are not for publication, but their arrangement should prove of inestimable value to a salesman where competition is keen.

Mr. Myers strongly advocates paying a truck driver good wages, favoring a daily wage of at least \$3.50. The company does not employ any particular system for obtaining leads, and the salesmen conduct their own follow-up campaigns. The head of the sales department and the salesmen may be compared to a large family, as there is an absence of "I am the manager, and it's up to you to make sales," more so than in most companies. As a result, every salesman is a live wire.

Mr. Myers believes that the truck industry, as a whole, would be benefited if the prospective purchaser would eliminate the defensive attitude when talking to a representative of a high grade truck. Some prospects underrate the judgment that placed the valuation on the car and do not take into consideration the principles of the company nor the factory in back of the product.

## GENERAL MOTORS' ORDERS SHOW GAIN

The General Motors Co. has reported gross sales for the six months ending January 31st amounting to \$74,000,000. January's income was estimated a gain of \$37,142,606 over the corresponding months of the preceding year. After deducting \$524,482 for preferred stock dividends the profits amount to \$13,000,000. In the corresponding half of the year 1915 the net income was \$6,446,534.

## Sees Good Future in the West

By A. A. WILLOUGHBY



**P**AUL S. NICHOLS, manager of the truck department of the Pacific KisselKar branch, is one of the pioneer motor truck salesmen of San Francisco, having been actively engaged in the industry for the past seven years, five of which have been given to the selling of Federals.

The first agency handling the Federal line was the Standard Motor Car Co., which was succeeded by the present company. The first carload of trucks was received on May 16, 1911, and since that time over five hundred trucks have been sold through this agency.

Branch agencies are maintained in Los Angeles, San Diego and Oakland, covering California, Nevada, Arizona and the Hawaiian Islands, each branch handling a certain section of the territory, together with a total of thirty sub-dealers. No agencies are closed with any one who is not in the garage or selling business and who has not a service station. The contract with the sub-dealer calls for the proper care of the truck after it has been sold to the customer. For this reason and the care with which the dealers have been selected, the depreciation of the trucks handled by this company has been above normal. Rebuilt trucks of this make of the 1911 and 1912 vintage sell readily for as high as \$1250, this proving an added protection to the customer.

Mr. Nichols, speaking of the various factors entering into the conduct of the business, said: "We renew our contract with the manufacturers yearly, which we have found to be the most satisfactory

from both our viewpoint and from that of the manufacturer. We can better determine each successive year the number of trucks we think we can dispose of. The distance from the factory requires a much larger stock of spare parts to be carried than is ordinarily necessary, and we maintain one of the largest service stations west of Chicago here in San Francisco. It is 175x275 ft., taking up the second floor of an entire block. No elevator is necessary, owing to the fact that the side streets occur at a considerable slope. All of our branches maintain service stations and service equipment.

"Our guarantee to the purchaser covers the installation of any defective parts by the dealer or sub-dealer free of labor cost for a period of one year. The service equipment is furnished at no cost to the owner, providing his truck is disabled because of some defective part. Our experience has been with the San Francisco station and the branches that the repair service per car has been extremely small. We also believe that this method keeps our customers in close touch with us at all times, more so than any other method which has been devised. We also provide free monthly inspection with the guarantee, which includes giving the car a general inspection to see that nothing has been neglected and that all parts have been properly oiled and greased, and should it be found necessary to do any repair work or oiling or greasing, a reasonable charge is made to cover this service. While the guarantee is but for a year, we endeavor to keep in close touch with our customers at all times.

"The cost analysis sheets of truck operation sent out by the manufacturers is very helpful, although it has been our experience that the average customer out here doesn't actually know what his delivery costs have been except in a hazy way. I don't know of a single instance where we have had to make a cost analysis for a customer so far—that is, for the individual user.

"The five reasons that seem to me to be the prime factors for a successful truck dealer's success are: The truck itself, maintenance of price, service, consistent advertising and factory assistance. Referring to the second item, we have never cut a price nor will we permit a dealer to do so. We have never considered whether the price on the truck was a so-called high one or a low one, as we feel that regardless of price, it is necessary to maintain quality at all events.

"The cost of horse delivery does not actively enter into our selling arguments, as the most of our prospective buyers are convinced that the motor truck is the more economical to use.

"With reference to the future of the industry in our territory, I would say that I think that only the surface has been scratched. There is so much territory in the West yet undeveloped that is available to motor truck operation that I do not feel we have even started. There are hundreds of miles of stage routes that are open all or nearly all of the year, where the old horse stage is still prevalent and which will be changed over in the next few years. There is not the traffic to warrant the railroads making more extensions for a number of years and the motor truck offers the solution for the rapid building up of the West.

"We handle our salesmen on a salary and commission basis, as we have learned after trying both forms that the combination gives the best results in that it centers the salesman's interest at all times."



### New Elevating Dumping Body by Gramm-Bernstein

The illustrations show a new elevating dumping body which has recently been designed by the Gramm-Bernstein Company, of Lima, Ohio. The body is fitted to a 5-6 ton chassis. This body is hoisted about 3½ ft. from the top of the frame by means of an hydraulic cylinder mounted inside a tube in the center of the body. Pressure for raising body is furnished by a small rotary pump driven by the engine. Sliding doors in bottom may be opened on either side at will in order to chute the material into any desired position. Any reasonable number of compartments may be made in these bodies. Body may be stopped at any point going up or coming down by simply moving a small valve lever into lock position.





## Duplex Four-Wheel Drive Trucks in Two Models



**E**XTREME efficiency at low operating cost is the purpose of the design of the Duplex Four-Wheel-Drive Trucks, built by the Duplex Power Car Co., of Charlotte, Mich., which are known as model C, with load capacity of 4000 lbs., and model D, with load capacity of 6000 lbs. The chief characteristic of the machines is that they are driven by all four wheels and steered by either two or four wheels.

### Models C and D

The engines used are Buda make, C having engine  $4\frac{1}{8} \times 5\frac{1}{2}$  in., D having engine  $4\frac{1}{4} \times 5\frac{1}{2}$  in. S.A.E. ratings are 27.23 and 28.9 h.p. respectively. Cylinders in both are "L"-head type, cast in block engines have Duplex centrifugal governor limiting the car speeds to 12 and 10 m.p.h. respectively. Carburetor is a Schebler Model R. Ignition by Eisemann or Bosch. The unit power plant, including disc clutch running in oil and a four forward speed selective type transmission, has three-point suspension. The vertical tube radiator is carried on spring supports to protect it from frame distortion strains.

### Drive

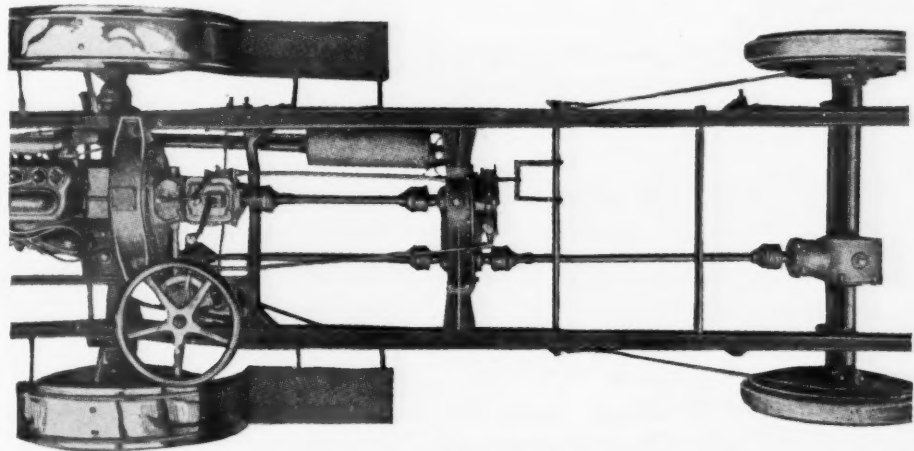
Drive is by shaft with two universal joints, to the sub-transmission or junction box, which is mounted on heavy cross-member of frame. The rear end of shaft

of junction box carries the service brake drum. Main and countershafts of the junction box have  $3\frac{1}{2}$ -in. sprockets, affording a 2:1 reduction, driven by silent chain running in oil. From either end of the countershaft the driving shafts, with a universal joint at either end, extend to the differential gears of the axle jackshafts. The axle jackshafts are of two types, the one illustrated being used for all forward axles, and for both axles of the four-

vertically webbed flanges and are fitted with Timken roller bearings. Jackshaft is mounted on heavy roller bearings, and has universal joints outside the brackets, packed with grease and enclosed from dirt. The only difference between the models C and D drive systems is the size of parts.

### Rear Axle—Two-Wheel Steer

This is "I"-beam section, drop-forged



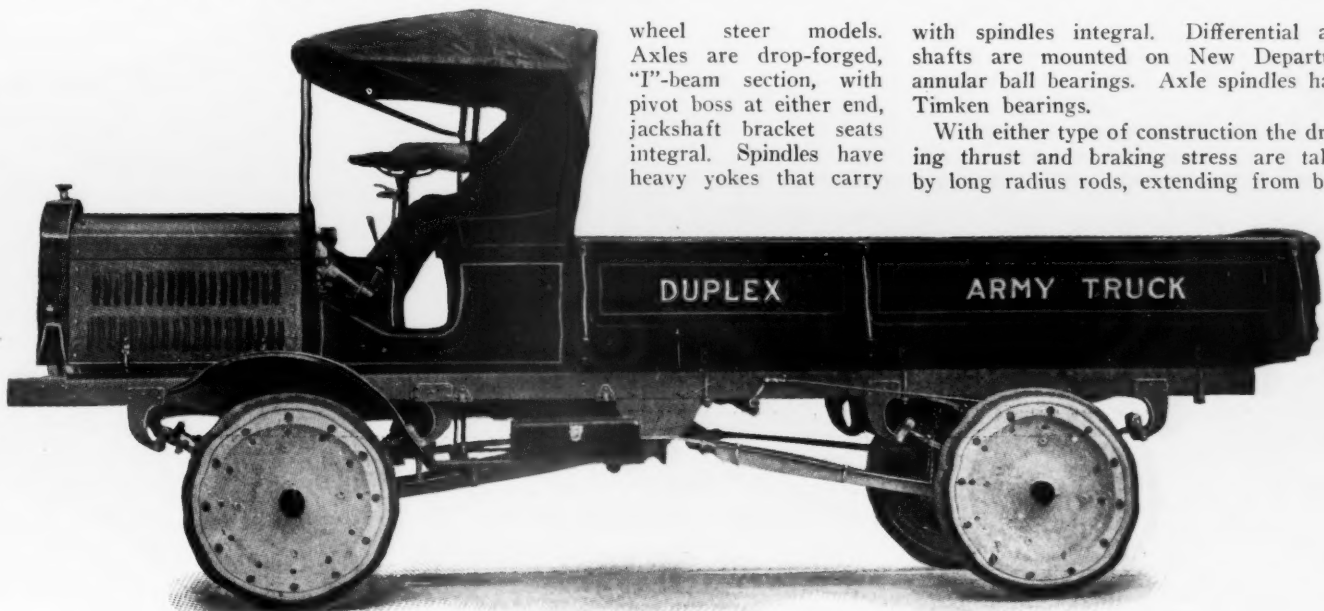
**Top Plan View of Chassis of Model C Duplex Truck**

This is the two-ton model. These trucks are made as two-wheel or four-wheel steer types, according to what uses they are to be put to by the user. Drive in the subtransmission, located at center of chassis, is by silent chain.

wheel steer models. Axles are drop-forged, "I"-beam section, with pivot boss at either end, jackshaft bracket seats integral. Spindles have heavy yokes that carry

with spindles integral. Differential and shafts are mounted on New Departure annular ball bearings. Axle spindles have Timken bearings.

With either type of construction the driving thrust and braking stress are taken by long radius rods, extending from both



**Duplex Four-Wheel Drive Three-Tonner**

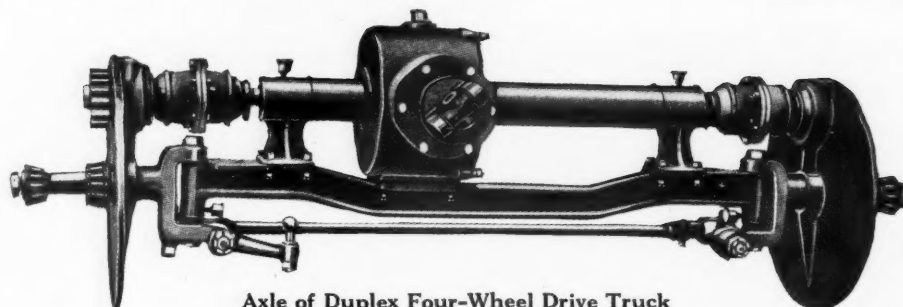
This is one of the trucks used by this government. Note the radiator supported by springs, and the arms extending down from frame to receive spring shackles. Wheelbase is 130 in. Internal-gear drive. This is known as Model D

The CCJ has most readers because it gives most information

axles to heavy brackets mounted at the centers of the side members of the frame.

#### Frame Springs

Frame is heat-treated, 5-in. channel section, with five cross-members and two tie-rods. The semi-elliptic springs are mounted on the steering axles under the universal joints, and on the dead axles under the jackshaft housings. Wheels are wood or steel, artillery type, 36x4 in., demountable solid tires on model C and 36x5-in. tires on the model D. Standard wheelbase is 130 in. Frame length, 218 in. The irreversible steering gear is worm and gear type, column located on left, control lever's being at driver's right. The service brake drum on the sub-transmission or junction box is 8x2 in., the emergency brake shoes are on the steel driving drums which are 18 $\frac{3}{8}$ x2 $\frac{1}{2}$  in.



**Axle of Duplex Four-Wheel Drive Truck**

Note the driving pinions of internal-gear drive. All parts are enclosed, protecting them from dirt, giving longer life. Axle bed and steering knuckle are made of alloy steel, drop forged and heat treated. Note heavy roller wheel bearings.

As far back as 1911 the Harvey Motor Truck Works, Harvey, Ill., began in a moderate way the manufacture of 3 $\frac{1}{2}$ - and 1 $\frac{1}{2}$ -ton chain drive motor trucks. They

The present output of the Harvey Motor Truck Works is four trucks a week. The practical tests of the products of the plant, by employing their trucks in and about Chicago, in various lines of hauling, has created a demand from those interested in their successful operation in this city. The record for one day for twenty-three Harvey Motor Trucks, operated from their Chicago service station, 435 South La Salle Street follows: The average distance was fifty miles in and out of Chicago, many of them subjected to "Loop" congestion, several hauling to suburban points, those in department store service, for example, number 28 recorded seventy miles and in that service as many as 200 stops are made. The hauling is all heavy contract work, both parties to the

#### Chassis of Duplex Four-Wheel Drive Two-Tonner

This is the Model C two-ton Duplex four-wheel drive truck. It has an engine 4 $\frac{1}{8}$  x 5 $\frac{1}{2}$  in., four-speed transmission, disc clutch, internal-gear drive.



### THREE WORM-DRIVE TRUCKS COMPRISE NEW HARVEY LINE

A new line of worm-drive motor truck announced by the Harvey Motor Truck Works, Harvey, Ill., consists of 2-, 3 $\frac{1}{2}$ - and 5-ton models. The models are similar in general layout, as they are equipped with Buda engines, Sheldon axles, Brown-Lipe transmissions, Hartford cone clutch, Spicer drives, Ross steering gears, Eisemann magnetos of the automatic advance type, and Schwarz wheels with interlocking spokes.

The engines are placed under the hood in front of the seat, and are equipped with Duplex governors, limiting the speed to 1000 r.p.m. The frames are of rolled channel steel. The transmission is placed amidship, which makes it very accessible. The drives are straight line under load and are taken through the springs, eliminating torque and radius rods.

The line consists of the following models, tabulated according to principal specifications.

Model	WF	WH	WK
Capacity, tons	2	3 $\frac{1}{2}$	5
Price	\$1975	\$2700	\$3400
Wheelbase	150 in.	150 in. and 168 in.	150 in. and 168 in.
Tires, front	36 in. x 4 in. single	36 in. x 5 in. single	36 in. x 6 in. single
Tires, rear	36 in. x 6 in. single	36 in. x 5 in. dual	40 in. x 6 in. dual



**A Harvey Three and a Half Ton Model**

This Harvey three and a half ton truck has a body 7 x 15 ft. Tailgate 1 $\frac{1}{2}$  ft. The two larger Harvey models can be had in two wheelbase lengths

built trucks for their own teaming service, which is operated from their service station, 425 South La Salle Street, in the "Loop" and opposite the La Salle Station, one of Chicago's great passenger railway terminals.

contract seeking the greatest possible profit from motor truck operation.

The following figures taken from a printed form used for a daily report only the gasoline consumption is charged, necessary now, more than at times when war prices do not prevail. Other operating expense records were unavailable.

A total of twenty-three trucks, four 3 $\frac{1}{2}$ -ton, the balance being 1 $\frac{1}{2}$ -ton models, used a total of 167 gals. of gasoline.



## Trojan Truck, Model 26, Has Worm Drive and is Furnished in Two Wheelbase Lengths



**T**HE Commercial Truck Co., of Cleveland, Ohio, confines itself to the manufacture of one truck model known as Model 26, which is offered with 120-in. wheelbase at \$1500 and with 45-in. wheelbase for \$100 additional. Prices include dash, seat, lamps and tools. Its features are unit power plant and worm drive, and the extra long wheelbase obtainable.

### Unit Power Plant

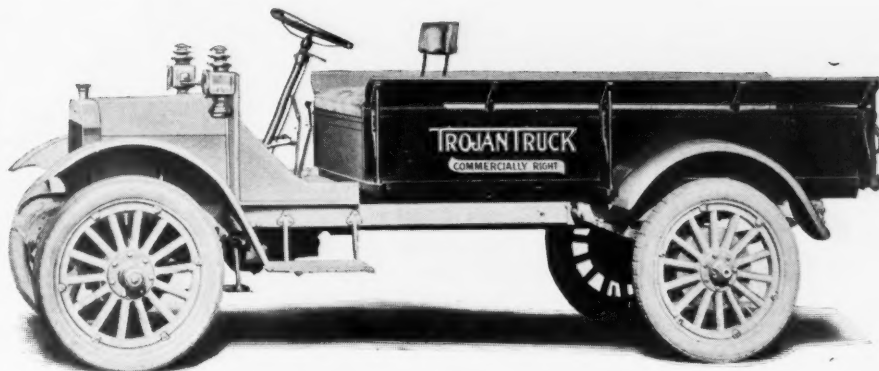
The engine is a four-cylinder, "L"-head type, with cylinders cast in block, bore  $3\frac{3}{8}$  in., stroke 5 in. S.A.E. rating is 18.23 h.p., piston displacement being 178.9 cu. in. Maximum speed is 25 m.p.h. Ignition is by Bosch, but if starting system is desired, a Westinghouse system of two unit type is obtainable at extra cost of \$75. The carburetor is a Stromberg. Lubrication is by force feed. Engine is, water cooled by thermo-siphon system. Honey-comb radiator is used.

Crankshaft is offset to allow removal of connecting rods and pistons through engine base. Valves are enclosed. Pistons are tapered to allow for expansion, and have three  $\frac{1}{4}$ -in. rings each. Clutch is dry plate type, transmission being selective type with three speeds forward. Unit power plant has three-point suspension.

### Frame

Frame is of pressed steel,  $\frac{1}{2}$  in. section, with  $2\frac{1}{2}$  in. insweep at the front to give short turning radius. Frame has three cross members. Steering gear is worm and unit type and on left side, control levers being in the center.

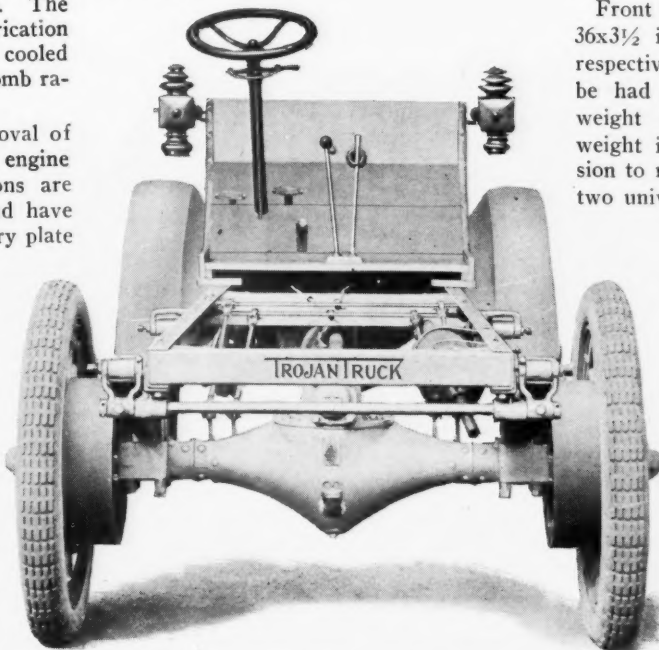
Both sets of brakes are internal expanding on 16-in. drums, and faced with wire woven asbestos. Springs are semi-elliptic, rear  $43 \times 2\frac{1}{2}$  in., with main plate  $\frac{3}{8}$  in. of vanadium. Front are  $39 \times 2$  in., with  $\frac{5}{16}$  in. main plate of vanadium.



**The One-Ton Model 26 Trojan Truck**

This model has worm drive and unit power plant. The four-cylinder engine has cylinders cast in block. Bore is  $3\frac{3}{8}$  in., stroke 5 in. This model can be had with 120 or 145 in. wheelbase, and solid or pneumatic tires.

Front wheels are  $36 \times 3$  in., rear being  $36 \times 3\frac{1}{2}$  in., each having solid tires of its respective size, although pneumatics can be had if desired. Percentage of total weight on rear wheels is 60. Chassis weight is 2900 lbs. Drive from transmission to rear axle is by propeller shaft with two universal joints.



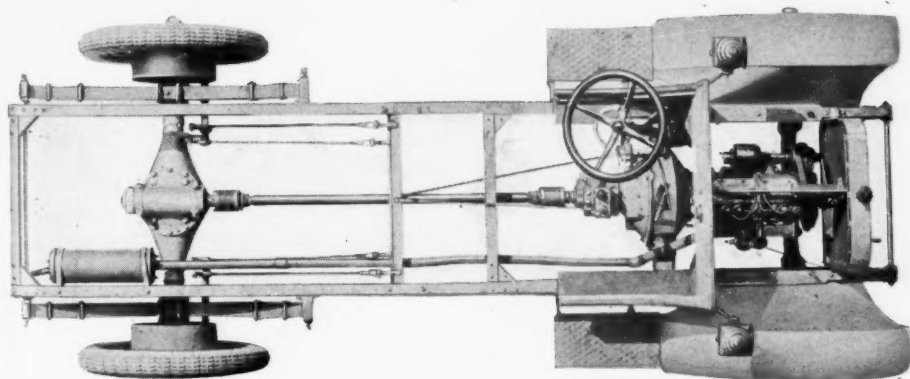
**Rear View of Trojan One-Ton Truck**

This is known as Model 26. Rear axle is worm drive type. Both brake sets are internal expanding on 16 in. drums. All springs have main leaves of vanadium.

### FEWER TRUCK WHEEL DIAMETERS STEP TOWARD LOWER TIRE PRICES

"Experience of all tire manufacturers, wheel builders and makers of steel rims," declares S. V. Norton, manager of truck tire sales for the B. F. Goodrich Co., Akron, Ohio, "has proved that unnecessary manufacturing costs can be eliminated through universal adoption by truck makers of fewer wheel sizes than the number used at present. Instead of honoring specifications for six different wheel diameters, 32 in., 34 in., 36 in., 40 in. and 42 in.—these to be had in seven different widths, making forty-two different sizes—half this number is amply sufficient to answer the service demands of any form or make of commercial motor vehicles. With only three standard diameters, 34 in., 36 in. and 40 in., to be provided, manufacturing and selling costs will be reduced, and the net result will prove greatly to the advantage of the ultimate consumer."

The Society of Automobile Engineers has already revised its original standards of 1911 to provide for only the three most practical and most-in-use diameters, viz., 34 in., 36 in. and 40 in. A vigorous campaign is now on to influence all truck manufacturers to put into practice this recommendation for fewer diameters. At present 75 to 80 per cent. of all tires sold are 36 in. and 40 in. sizes. Probably 90 per



**Top Plan View of Model 26 Trojan Truck**

Here is shown three-point suspended unit power plant. Magneto is shown on left of engine, carburetor and valves being on right. Note long exhaust pipe. Tubular tie rod in front prevents damage to radiator in case of collision; acts as frame brace and spring bolt.

The CCJ leads in circulation, advertising and prestige

cent. of the tires applied to newly manufactured trucks are of these two diameters, while the 34-in. size is included to take care of trucks whose design requires a smaller wheel.

### THE "TRAILMOBILE"

The Sechler & Co., Cincinnati, Ohio, has placed on the market a number of models of the "Trailmobile," shown in the accompanying illustration. This trailer is intended for towing by light trucks or pleasure cars and the trailers are guaranteed up to 20 m.p.h. for either chassis.

Two chassis are supplied, one being of 1250 lbs. capacity and the other of 1500 lbs. capacity. The lighter chassis has a loading space 39 to 42 in. wide and from 85 to 95 in. long, depending upon the body style. Tires are 32x2 in. front and rear. The weight of the chassis is 530 lbs. The bodies weigh from 185 lbs. up. Price for



**Trailmobile With Flareboard Body**

Other bodies may also be had. screenside, canopy top, army style, etc.  
Prices range from \$208 to \$300

the chassis only with solid tires and without fenders is \$179.

On a 1500 lb. chassis the loading space is 40 to 42 in. wide and 95 to 100 in. long, depending on body style. Tires are 32x2 in. front and 34x2½ in. rear. The weight of the chassis is 570 lbs., the bodies weighing 230 lbs. upward, depending upon the type. The price of the chassis only with solid tires and without fenders is \$208. Both these chassis can be with ten styles of bodies to suit purchaser. The axles are square 1⅜ in. section front and rear. Wheels have fourteen spokes with twelve bolts in flanges. Wheelbase is 62 in. and tread 56 in. or 60 in.

Two styles of couplings can be furnished, the No. 1 being especially made for Ford cars, and is attached by simply clipping over rear member of Ford chassis frame. The No. 2 coupling is for cars where the rear cross member of frame is accessible.

### CORRECTION FOR REVIEW

On page 24 of the February COMMERCIAL CAR JOURNAL we showed an illustration of the International Model F 1-ton Express in the Annual Commercial Car Review. Through a typographical error, the maker was given as the International Motor Co., whereas the maker is the International Harvester Corp., Chicago, Ill.

### LEE TWO-WAY SIDE-DUMP BODY ON JEFFERY QUAD

The Lee two-way, side-dump body shown in the accompanying illustrations attached to a Jeffery Quad, is operated entirely by hand. This body is made by the Lee Loader Co., Chicago, Ill. By referring to the working view the method of operation will be made clear. The body (A) is secured in position by a catch (B), a similar catch in the front, an eccentric stop (C) and a similar stop at the other side, as well as by the three rails (D,D,D) on which it rolls in dumping. Each of these rails slopes away from the center line of the chassis to each side, and terminates in a hook which acts as one of the final pivoting points when the body is being dumped.

In dumping, the handle (G) in the middle of the body, is raised, thus releasing the eccentric stop (C). The support (H) is now free to move outward, so the operator now pulls the handle (G) toward him and allows the support (H) to hang down-



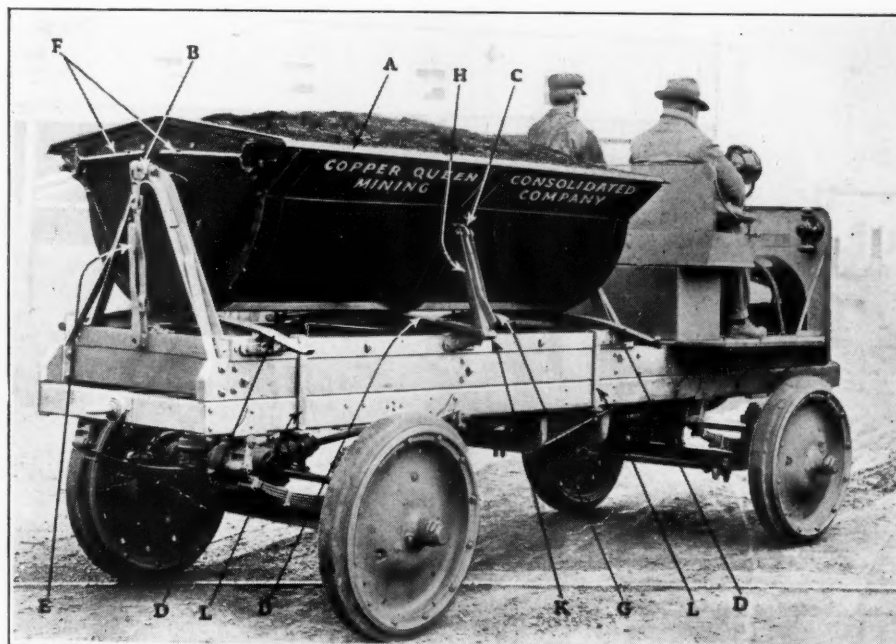
**Driver Dumping Lee Body**

In tests at the Jeffery factory it was found that the average driver could perform this operation in half a minute.

in front, to which it is connected by a longitudinal rod. The body is now ready to be dumped, which is done by pulling out one of the handles (F) and pressing on it easily until the body rolls over on the rails (D,D,D), the distance through which it rolls being governed by the length of the restraining chains under the body.

The support (H) and the catch (B) are now quickly replaced, both front and rear catches being operated at the same time by either the handle (E) or the similar one at the front of the body.

The operator can dump and roll back the body with the same motion, and in tests it has been found that the average driver at the Jeffery plant could do this in half a minute.



**Lee Two-Way, Side-Dumping Body on Jeffery Quad**  
The bodies are made in all sizes, from two to six yards capacity

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers



## The Transport Tractor With Capacity of Five Tons, \$2500



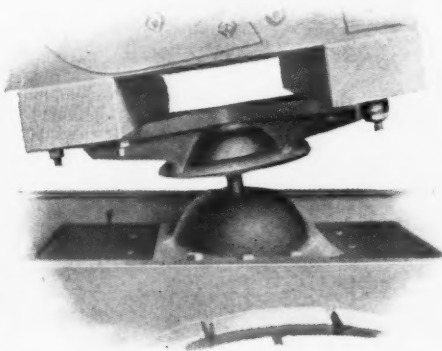
**T**HE Transport Tractor Co., Inc., 87-93 Sunswick St., Long Island City, N. Y., is placing on the market the model T, 5-ton tractor, the only model which is being produced at the present time. The officers of the corporation are George B. Kelly, president; Alexander W. Moffit, Vice-President, and Frederick B. Stimson, Secretary and Treasurer.

The Transport Tractor Co. is concentrating its resources in the production of a single model worm-drive tractor which hauls 5 tons and is attached by means of a patented connection to any horse-drawn vehicle or any trailer built to meet individual needs. This tractor when coupled to any trailer will turn within a circle 25 ft. in diameter. It is quite easy to handle, the simple control and light steering enabling the driver to handle the tractor under difficult traffic conditions. The tractor will back its trailer into difficult position for unloading. Particular effort has been made in the design of this tractor to simplify the driving work, keeping the tractor properly lubricated. Large grease cups, which are easily filled, are located on spring bolts, steering column, brake shaft and fan, every cup is accessible. The engine is filled with oil through a convenient filler pipe. Transmission and universal joints are filled with grease every 2500 miles, the

rear axle requires lubrication once in 10,000 miles.

### Engine

The engine has four cylinders,  $3\frac{1}{2}$ -in. bore by  $5\frac{1}{8}$ -in. stroke, being of Buda manufacture, using a circulating splash system of lubrication. Bosch magneto with fixed spark, thermo syphon cooling



**Tractor Connection, Showing the Upper and Lower Members Separated**

and Zenith carburetor. It is stated that this tractor averages a little better than eight miles to a gallon of gasoline.

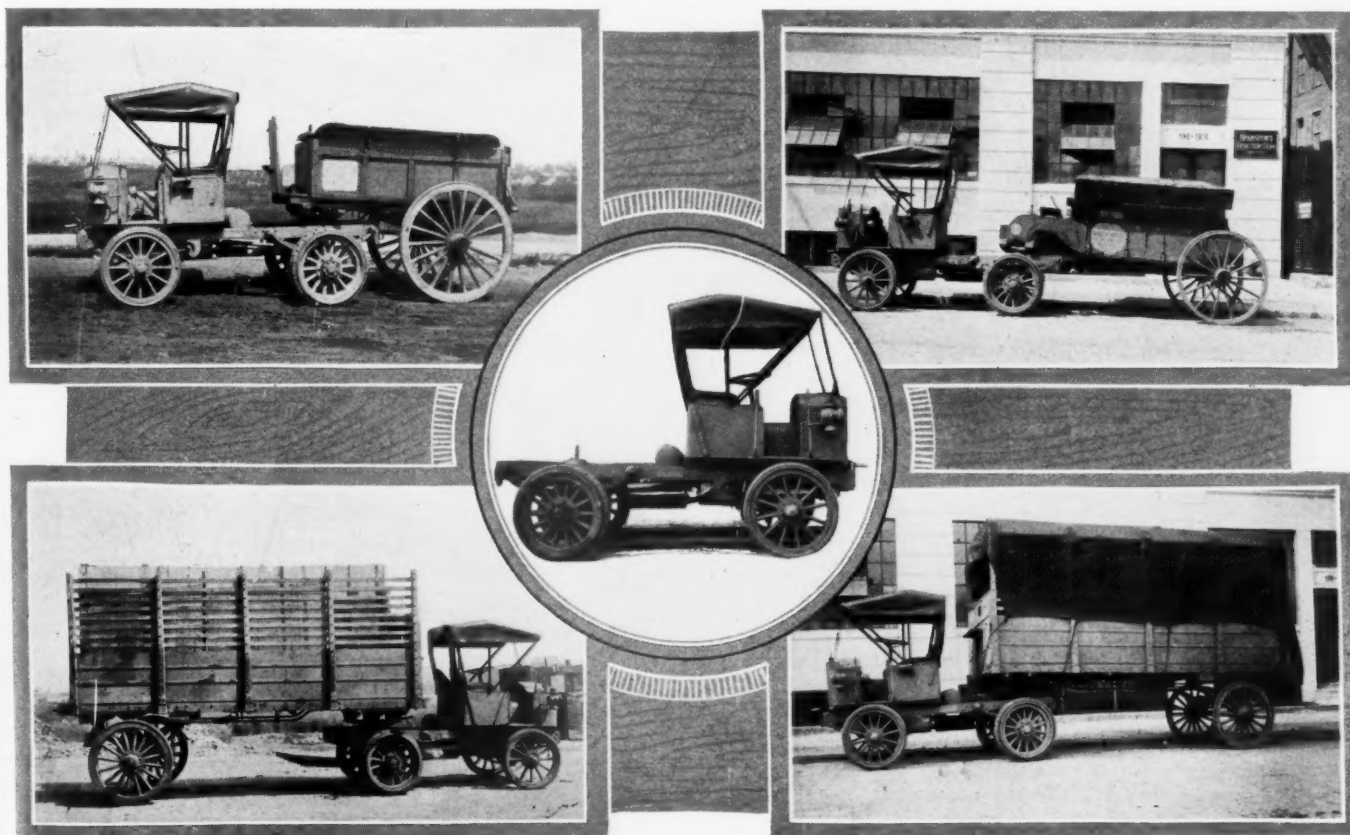
### Transmission and Clutch

The transmission is designed to transmit 50 h.p. or more than double the rated

power of the engine with which it is used. The transmission and clutch are contained in one housing which bolts direct to the engine, thus forming a unit power plant. Timken bearings are used throughout and the gear shift lever is erected in the cover and engages a three-speed selective sliding gear system. The gear ratios between the engine and rear wheel are as follows: Reverse, 59:1; low, 45.8:1; intermediate, 24:1; high (direct drive), 13.6:1. The clutch, as noted above, is a part of the transmission unit and is of dry disc construction requiring no attention or lubrication.

### Other Details

Double Spicer universal joints are used between transmission and rear axle. Frame is of 5-in. channel section steel with two cross members securely gusseted and a 29-in. steel plate reinforced with angle iron for the support of the tractor connections. Drive is taken through the rear spring; steering is by worm and sector gear with 18-in. wheel drive to rear axle through a worm and gear of the hourglass type, running in a bath of oil. Two sets of special thrust bearings take up all worm gear side thrust. The reduction at the axle is  $13\frac{2}{3}:1$ . Steering is on the left side with control levers in the center. The end of the accelerator pedal connects directly to the carburetor and the brake and clutch are strong and simple.



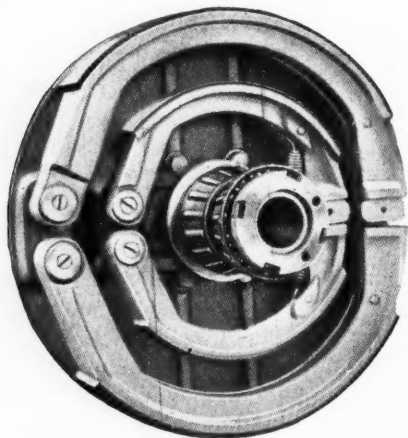
### Transport Tractor and Some of the Vehicles to Which It May be Attached

The capacity of this tractor is five tons, the tractor equipment consisting of tractor connection, upper and lower members complete; lamps, horn, governor, speedometer, jack, tools and three-bow top. The price is \$2500

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

### Brakes

Particular attention is called to the size and arrangement of the brakes on this tractor. Two concentric drums on the rear wheel fit a circular plate on the axle spindle and effectually keep out dirt and



**Transport Showing the Two Sets of Expanding Shoes**

The inner set being the hand brake, the outer set being the service brake

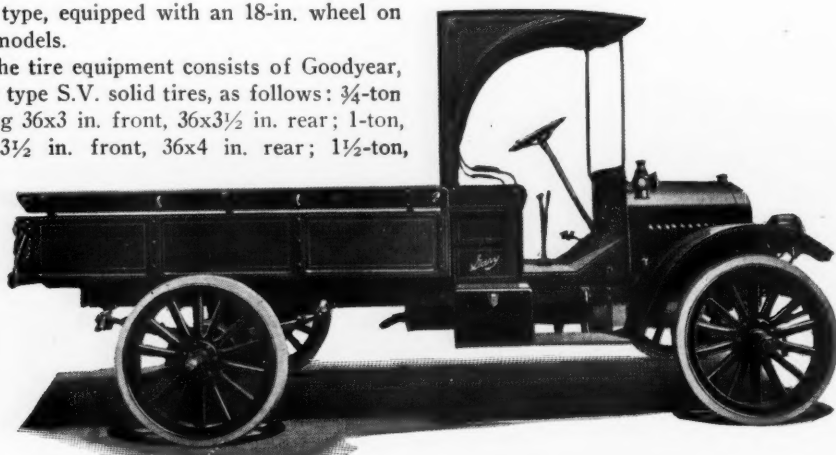
water, the hand brake expands within the former drum which is 11x2¼ in., the service brake which has a 3-in. face and expands within an 18-in. drum. This large total braking area assures safety of operation and economy in brake lining.

Tires are 34x3½ in. front with smooth tread, those in the rear being 34x4 in. dual with block tread. The weight is 3500 lbs. fully equipped.

### GARY LINE CONSISTS OF FOUR WORM-DRIVEN MODELS

The Gary Motor Truck Co., of Gary, Ind., is building a line of worm drive commercial cars, in four models, viz: Model E, ¾-ton; Model F, 1-ton; Model G, 1½-ton. and Model H, 2-ton. All models are equipped with Buda engines, Eisemann high tension magnetos, Stromberg carburetors, Fuller unit power plant, transmission and clutch, pressed steel flexible frames. The springs are semi-elliptic, front and rear. The steering is of the worm and split nut type, equipped with an 18-in. wheel on all models.

The tire equipment consists of Goodyear, new type S.V. solid tires, as follows: ¾-ton using 36x3 in. front, 36x3½ in. rear; 1-ton, 36x3½ in. front, 36x4 in. rear; 1½-ton,



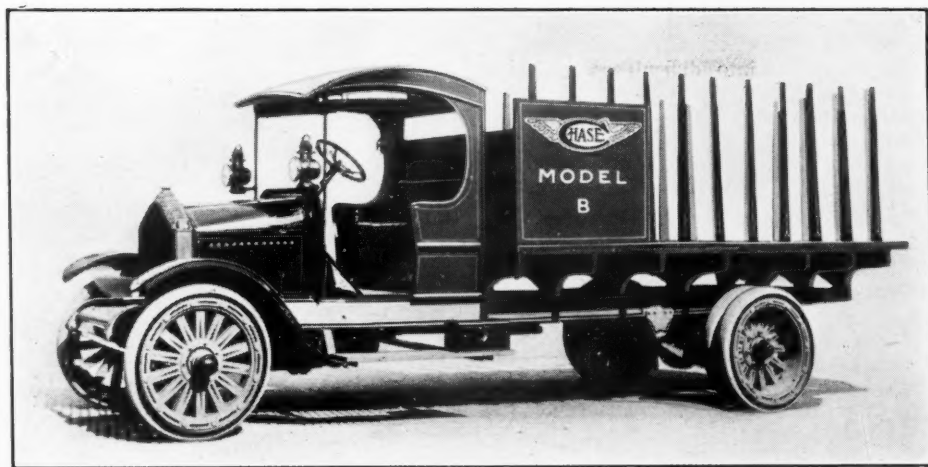
**Gary Model E Fifteen Hundred Pound Worm-Drive Truck**  
The other Gary models are identical in appearance and differ only in size of units

36x3½ in. front, 36x5 in. rear; 2-ton, 36x4 in. front, 36x6 in. rear.

The equipment consists of side oil lamps, tail lamp, horn, jack and tools. Either express or stake bodies are furnished as regular equipment. Special bodies to order.

### CHASE BRINGS OUT TWO AND A HALF TON WORM-DRIVE MODEL

The Chase Motor Truck Co., Syracuse, N. Y., has announced a new addition to its line in the Model B, 2½-ton worm-drive model. The engine has four cylinders, L-head type, bore 4⅞ in. and stroke 5¼ in. Engine, clutch and transmission form a unit power plant. Cooling is by water and ignition is by Bosch high tension magneto. A governor is fitted, and this is entirely automatic, and can be entirely closed and sealed. Gasoline is fed to the carburetor from a 23-gal. tank, the oil tank holding 2 gals. Control is by hand throttle and foot accelerator.



**New Chase Two and a Half Ton Worm-Drive Truck**

Has four cylinder unit power plant, 4⅞ in. bore, 5½ in. stroke and Sheldon worm-drive rear axle

### Clutch and Transmission

The clutch is of dry plate type, while the transmission is a selective sliding type member, giving three speeds forward and one reverse. The transmission case is attached to the flywheel housing.

matter of comparison also kept records of his team, with the following result:

### 15¾ Miles vs. 57¾ Miles

While the team and wagon was loaded and unloaded in exactly the same manner as the truck, the distance covered was in the ratio of 3.66 miles to 1 in favor of the truck. And even though each load was actually hauled between two and three times as far, the truck was still able to make double the number of deliveries.

In order to get at the relative earning power in still another way, the number of hours that team and truck were on the road were computed, and this figure in each case divided into the mileage covered gave the average net running speed, including delivery stops, in miles per hour. The results credited the team with 1.64 m.p.h., the truck with 7.15 m.p.h. This ratio of 4.36 to 1 in favor of the truck.

**Don't wait for Prospects—  
Go after them**



## Dorris Two-Ton Worm-Drive Model, \$1990



**A** CLOSE examination of the various components of the Dorris 2-ton model reveals a number of interesting features. Of prime importance is the engine, which is of overhead or valve-in-the-head type. The valves are very large and are operated with hardened rocker beams and adjustable valve rods. The valves are interchangeable and operated in interchangeable valve cages. The cylinders are cast in pairs. The bore and stroke are  $4\frac{3}{8}$  and 5 in. respectively. Engine is claimed to deliver 48 h.p. at 1680 r.p.m.

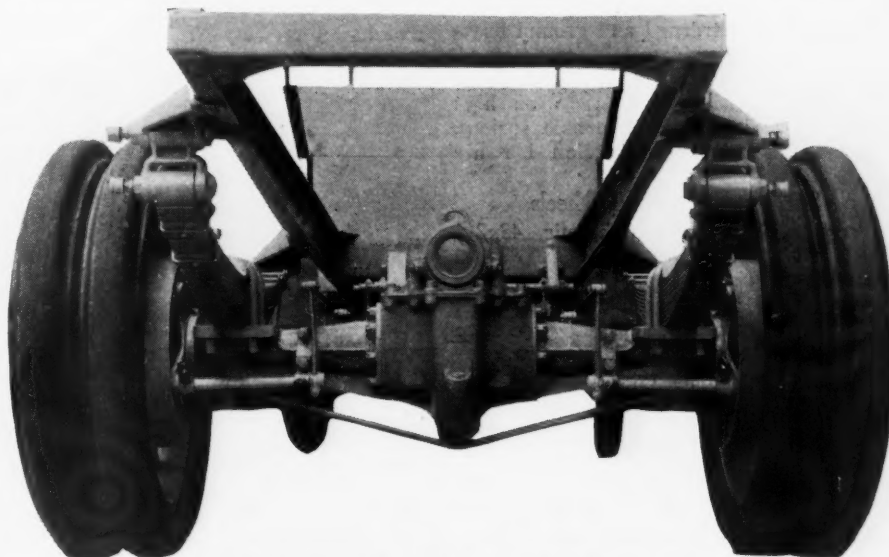
The crankcase is made of cast iron, cast in one piece, barrel shaped. The crankshaft may be removed through the rear end. The pistons are  $5\frac{1}{2}$  in. long and are fitted with three  $\frac{1}{4}$ -in. rings. The piston pin is  $1\frac{1}{2}$  in. in diameter and is mounted in very large "box Grau" bronze bearings. The crankshaft and connecting rods are all 40-point carbon steel drop forgings. The connecting rod is 12 in. between centers, which is unusually long in proportion to the stroke, thus greatly reducing side thrust. All crankshaft bearings are bushed with Lindhe shims. The camshaft is drop forged, 20 point carbon steel, mounted on three bronze bearings.

### Power Plant Three-Point Suspended

The entire power plant is three-point suspended. The crankcase gear cap is of cast steel, so designed as to act as a front support for the engine as well as a cover for the cam gears. Lugs are cast integral with this cover, and act as a support for the radiator, thus making the latter a part of the engine unit. The radiator is of the vertical tube, honeycomb type. The rear of the engine is supported by a cast steel hanger, bolted on the crankcase by six

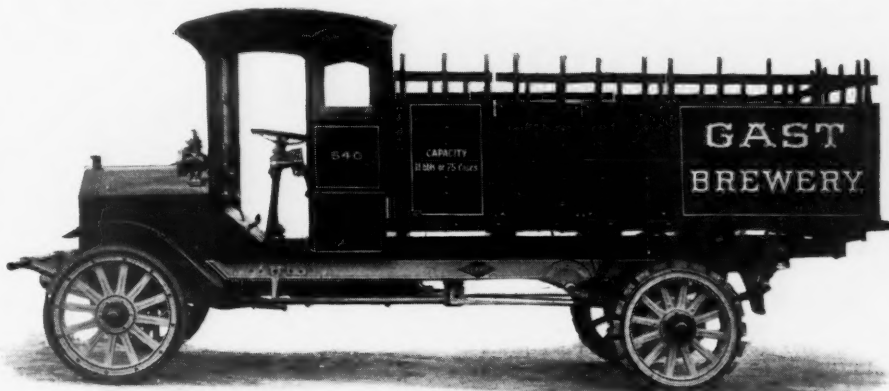
$\frac{1}{2}$ -in. studs. This also acts as a fly-wheel housing and transmission support, and is carried on a spring on either side, resting

on a conical base. Lubrication is by constant level circulating and splash system, maintained by gear pump.



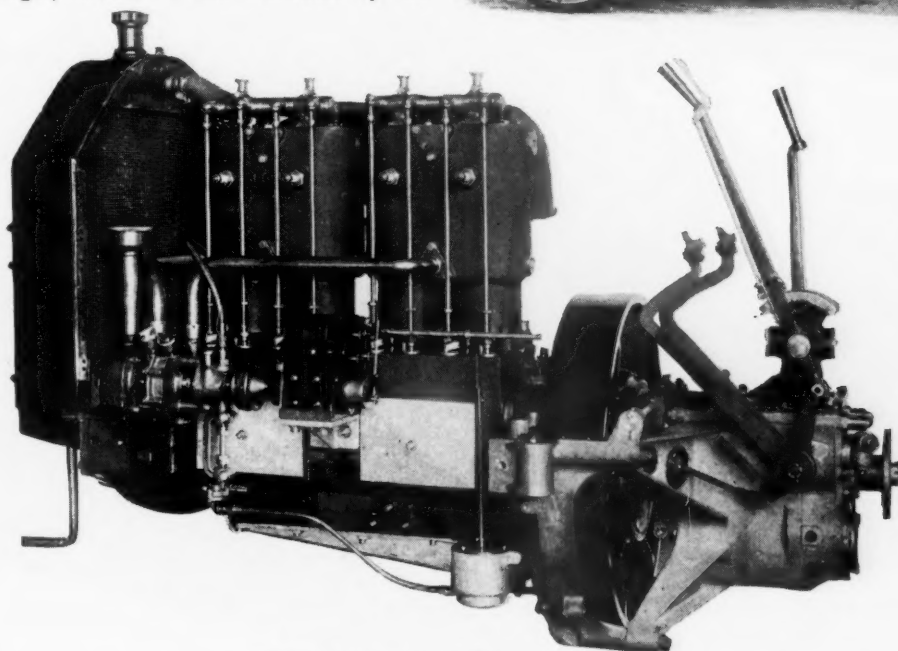
**Dorris Two-Ton Model—Rear Construction**

The Timken-David Brown worm drive is used. The springs are  $42 \times 2\frac{1}{2}$  in. semielliptic



**Dorris Two-Ton Chassis With Brewer's Body**

This body is mounted on the 144 in. wheelbase chassis



**Dorris Unit Power Plant—Left Side**

Engine is of valve-in-the-head type, rated at 48 h.p. at 1680 r.p.m. Showing also water pump, magneto and large hand holes

Ignition is by a Bosch magneto, using a dual system with dry cells for starting. A leather coupling is fitted on the magneto shaft.

Carburetor is a Model H No. 2 Stromberg, the intake pipe being hot-water jacketed. The carburetor control is on the steering column, and there is a rod for closing the air horn valve to facilitate starting in cold weather. There is a hand throttle on the steering column and also a foot accelerator.

The radiator is mounted on the crankcase gear cap, making a unit with the engine.

The Dorris speedometer drive is from a special gear in the interior of the transmission case, and connects the speedometer directly to the propeller shaft. This gear being enclosed, and running in oil, is noiseless and measures every revolution of the rear wheel accurately. This is an original

The CCJ has most advertisers because it gives them biggest returns

Dorris idea, and it eliminates possibility of damage to speedometer parts.

The propeller shaft is made in two sections with short tubular shafts. The center bearing is mounted on universal S.K.F. ball bearings, housed with packing nuts and grease cup. All flanges and crosses are drop forged. The slip joint is liberal in size and has ten splines. All bearings are fitted with hardened and ground bushings, and Spicer universal joints are used.

Drive to rear wheels is by Timken-David Brown worm with 7.75:1 ratio on high gear. Drive is through the side springs, and no radius rods or torsion bar are used.

#### Springs, Brakes and Wheels

Front springs are semi-elliptic, 42x2½ in. The front spring eyes are bushed and the rear of spring is supported on a roller. Rear springs are semi-elliptic, 54x3 in., with shackle at rear end, making positive though flexible connection to frame.

Wheels are artillery type, twelve spokes with S.A.E. bands for 36x4 in. single tires in front and 36x4 in. dual tires in rear. Wheels are mounted on Timken roller bearings.

Brakes are arranged in two sets, as usual, both sets being internal expanding, Timken duplex type, 16x3¼ in., lined with asbestos.

#### Other Details

Steering gear is irreversible worm and gear type, left side drive, center control, chassis weight, 4990 lbs.; wheelbase, 144 or 162 in.; 25-gal. gasoline tank; full equipment.

The price of the chassis is \$1990; governor and seat being extra.

#### BETTENDORF TRAILER FOR VARIOUS PURPOSES

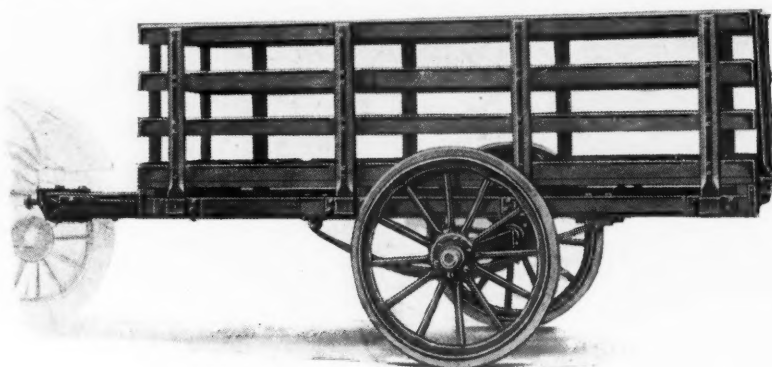
The Bettendorf Trailer Co., Bettendorf, Iowa, is manufacturing trailers in three sizes. The Model F has a capacity of 800 lbs., and retails at \$75. The body is solid panel, 6 ft. long, 4 ft. 3 in. wide, sides and ends 10 in. high, with 6 in. flare-boards. Springs are full elliptic, under-

slung, and the axle is of truck type, rectangular section, 1¼ in. Wheels are artillery type of second growth hickory, fitted with solid rubber tires, 30x1¾ in., Clincher truck type. Pneumatics can be furnished at an extra price. Body is painted red, the wheels being yellow, with black stripes. The weight crated is 370 lbs.

The Model S trailer is listed at \$100, and has a capacity of 1200 lbs. Body is stake type, 8 ft. long, 4 ft. wide and 1 ft.

6 in. high; sides and ends are removable. The axle is 1-beam section, 1½x2 in. Either Bower or Timken roller bearings can be furnished. Tires are 32x2 in., painting in black; weight crated, 445 lbs. Other details are similar to Model F.

The semi-trailer, with rocking fifth wheel, is shown in an accompanying illustration. The advantages of a rocking fifth wheel are sufficiently well known to make further reference to this unnecessary here.



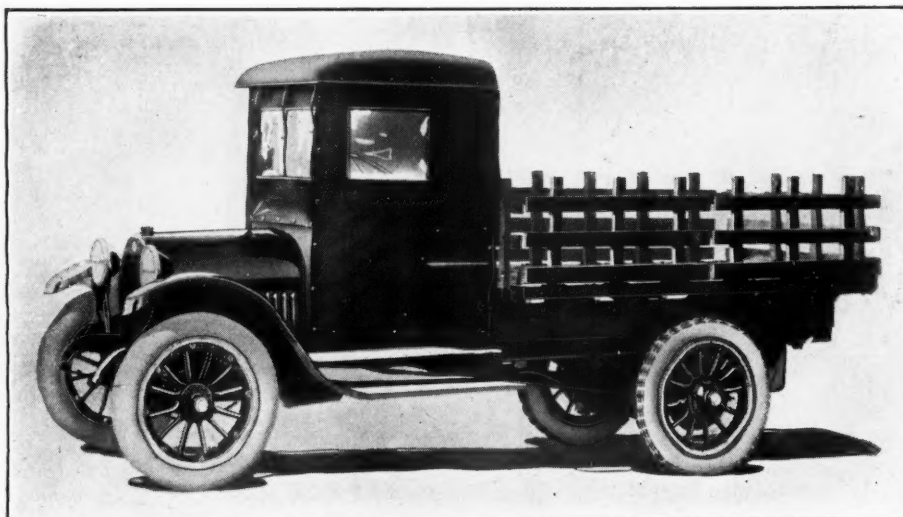
**Bettendorf Model S Trailer, \$100**

This has a capacity of twelve hundred pounds and has an automatic coupler which can be attached or detached in less than one second



**Bettendorf Trailer Attached to Ford Roadster**

This outfit enables a Ford roadster to haul a fifteen hundred pound load. Trailer may be disconnected in a few minutes to allow the car to be used for pleasure purposes



**Studebaker One-Ton Stake-Body Truck, \$1200**

Made by Studebaker Corporation, Detroit, Michigan. This model was described in our February, 1916, issue, page 64, but at that time we were unable to give illustrations of the stake-body model. Loading space is 5 ft. 6 in. wide and 8 ft. long.

#### TRUCK SAVES MINE PROFITS

Ray Bros., mine operators of Tucson, Ariz., recently held an option on the Mineral Hill Copper Mine and struck rich ore, but said as little as possible about it. When the Pittsburgh owners of the mine heard of the strike, they notified Ray Bros. by wire that they would have to relinquish possession of the mine on February 20th, when their lease expired. Ray Bros. placed an order for a White truck on February 12th, which was delivered on February 13th. It was immediately put into service, and from that time until the last minute of the lease plied between the mine and Sahuarita, the nearest railroad point, loaded with ore. The Rays have not received their final returns, so do not know just how much they made, but they know they have realized a greater profit than the \$5000 paid for the truck, besides having a practically new machine in the bargain.



# Complete Review of Automobile Trailers

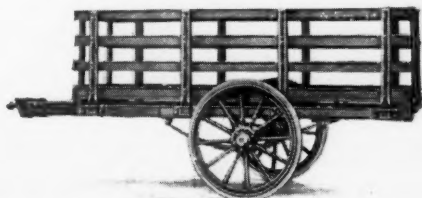
Owing to the Fact That We Have Recently Had Many Inquiries for Data Regarding Vehicles of This Class, We Have Decided to Publish All the Information at Present Available on Trailers, in This Review

Bettendorf Trailer Co., Bettendorf, Ia.



BETTENDORF MODEL F, 850-lb. FLARE BOARD, \$75.

Weight complete, 375 lbs.; load platform, 6 ft. long x 4 ft. 3 in. wide, sides and ends, 10 in. high, flareboards, 6 in.; semi-elliptic underslung springs; truck type rectangular axle, 1 1/4 in. section; ball bearings in wheels, artillery type wheels, solid rubber tires, 30x1 1/4 in., clincher truck type; body painted red, wheels yellow with black stripe; trailer tracks with towing vehicle.



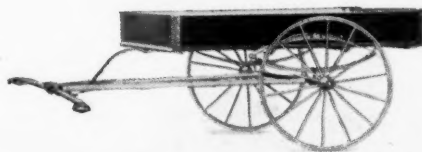
BETTENDORF MODEL S, 1200-lb. STAKE, \$100.

Weight complete, 445 lbs.; load platform, 8 ft. long x 4 ft. wide, side and end gates, 1 ft. 6 in. high; sides and end removable; I-beam axle, 2x1 1/2 in.; Bower or Timken roller bearings; artillery type wheels; solid rubber tires, 32x2 in., clincher truck type; painting, black, other colors special; semi-elliptic underslung springs; trailer tracks with towing vehicle.

BETTENDORF MODEL S-I, SEMI-TRAILER, \$150.

Capacities 1500 lbs. to 6 tons.

The Butler Co., Butler, Ind.



BUTLER No. 10, 1000-lb. SIDE BOARD, TRAILER.

Weight complete, 350 lbs.; body, 3 ft. 4 in. wide x 6 ft. long, side boards, 10 in. high, drop end gate at rear; solid rubber tires, 34x1 1/4 in.; square axle, 1 1/4 in. section; Timken roller bearings; tread, 56 in.; furnished with Bradley quick detachable couplers to fit any axle; finish in black with gold stripe, varnished, lettering extra.

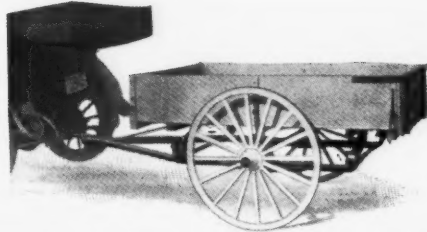
Curtis Trailer Co., Minneapolis, Minn.

CURTIS MODEL C, 1000-lb. BOAT TRAILER, \$90.

Specifications same as Model A.

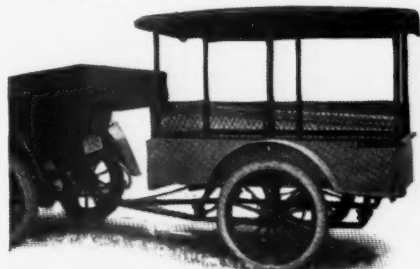
CURTIS MODEL B, 1000-lb. TRAILER, \$65. With 32x1 1/4 in. solid rubber tires; other specifications same as Model A.

CURTIS MODEL C, 1000-lb. TRAILER, \$90. With artillery wheels, 30x3 in. pneumatic tires and fenders; other specifications same as Model A.



CURTIS MODEL A, 1000-lb. OPEN BODY, \$47.50.

Body, 3 ft. 7 1/2 in. wide x 5 ft. 8 1/4 in. long x 11 1/2 in. high; rear end fitted with drop gate; front end gate removable; 1 1/4 in. axle; tread 56 in.; Sarven wheels; steel tires, 34 in.; solid rubber tires, 32x1 1/4 in.; pneumatic tires, 30x3 in.; clincher rims; finish, body and wheels blue black, frame and springs black; semi-elliptic springs; trailer tracks with towing vehicle; weight complete, 400 lbs.



CURTIS MODEL C, 1000-lb. TRAILER WITH TOP, \$137.50.

Specifications same as Model A.

CURTIS MODEL D, 1000-lb. TRAILER, \$100.

With artillery wheels, 30x3 in. pneumatic smooth tread tires, fenders and ball bearing axle; other specifications same as Model A.

CURTIS MODEL A, 1000-lb. WITH TOP BOX, \$54.50.

Specifications same as Model A open body.

Detroit Trailer Co., Detroit, Mich.



DETROIT MODEL B, 7-ton CHASSIS, \$1050.

Weight, 3200 lbs.; price with stake body, \$1175; height of loading platform, 45 in.; solid rubber tires, 36x7 in., demountable front and rear; wheelbase, 116 in.; tread, 63 in.; Springs semi-elliptic front and rear; trailer tracks with towing vehicle; semi-elliptic springs front and rear; drop forged steel axles; Bower roller bearings.

DETROIT MODEL B, 5-ton CHASSIS, \$875.

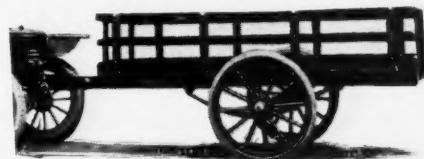
Weight, 2700 lbs.; price with stake body, \$975; height of loading platform, 45 in.; solid rubber tires, 36x6 in.; wheelbase, 104 in.; other specifications same as Model B, 7-ton trailer.

DETROIT MODEL B, 3-ton CHASSIS, \$650.

Weight, 2450 lbs.; price with stake body, \$750; height of loading platform, 42 in.; tires, 36x4 in. front and rear; wheelbase, 92 in.; other specifications same as Model B, 7-ton trailer.

DETROIT MODEL B, 1 1/2-ton CHASSIS, \$425.

Weight, 1500 lbs.; price with stake body, \$500; height of loading platform, 42 in.; load platform 6 ft. wide x 12 ft. long; solid rubber tires, 36x3 in. front and rear; wheelbase, 70 in.; tread 56 in.; other specifications same as Model B, 7-ton trailer.



DETROIT MODEL C, 1200-lb. STAKE, \$100.

Weight, 450 lbs.; height of loading platform, 23 in.; load platform, 3 ft. 10 1/2 in. wide x 8 ft. long; solid rubber tires, 32x2 in., clincher type; tread, 56 in.; three-quarter elliptic springs; trailer tracks with towing vehicle.

Durant-Dort Carriage Co., Flint, Mich.



BLUE RIBBON No. 1, FLAREBOARD, \$32.50.

Body, 3 ft. 6 in. wide x 6 ft. 6 in. long x 10 in. high; 1 1/4 in. axle; friction spindle or Liggett ball bearings; three-quarter platform springs; Sarven wheels; steel tires, 34 x 1 1/4 x 3/4 in.; hitch direct from axle of trailer to axle of towing vehicle; quick detachable Bradley type, hitch will fit any car; 1 1/4 in. rubber tires, \$6 extra; ball bearings, \$5 extra; fruit rack, \$6.50 extra.



BLUE RIBBON No. 2, FLAREBOARD, \$26.50.

Body, 3 ft. 4 in. wide x 6 ft. long x 10 in. high; drop end gate; 1 1/4 in. axle; friction spindle or Liggett ball bearings; semi-elliptic springs; Sarven wheels; steel tires, 34x1 1/4 x 3/4 in.; hitch direct from trailer body to auto chassis; fittings for Ford cars furnished regularly; 1 1/4 in. rubber tires, \$6 extra; Liggett bearings, \$5 extra; ring boards, \$1.50 extra; fruit rack, \$6.50 extra.

Defiance Carriage Co., Defiance, Ohio.

DEFIANCE No. 1, 1000-lb. FLAREBOARD, \$35.

Sarven wheels; 1 1/4 in. Concord axle; steel tires, 1 1/4 in. wide; two wheels; semi-elliptic springs; end drop gate.

DEFIANCE No. 2, 1000-lb. FLAREBOARD, \$43.75.

Sarven 34 in. wheels; solid rubber tires; other specifications same as No. 1.

DEFIANCE No. 3, 1000-lb. FLAREBOARD, \$53.75.

Sarven 34 in. wheels; Timken roller bearings; solid rubber tires; other specifications same as No. 1.

**DEFIANCE 1000-lb. CART WITH CANOPY TOP AND CURTAINS, \$58.75.**

Has removable rack; top bolted to flareboards; solid rubber tires; other specifications same as No. 1. With Timken roller bearings price is \$68.50

**DEFIANCE 1000-lb. CART WITH BUTCHER'S RACK, \$46.50.**

Has 34 in. wheels; steel tires  $1\frac{1}{4}$  x 5-16 in.; extra for solid rubber tires, \$8.75; extra for Timken roller bearings, \$10; extra for ball bearing axle, \$7.50; other specifications same as No. 1.

**DEFIANCE No. 4, 1000-lb. TRAILER, \$34.50.**

Body, 7 ft. long x 3 ft. 6 in. wide with side boards 1 ft. 8 in. high; side boards can be removed and stakes used; above price is with steel tires; with solid rubber tires, \$42.50; with solid rubber tires and Timken axle, \$53.50; extra for pneumatic channel wheels, \$4; other specifications same as No. 1.

**DEFIANCE No. 5, 1000-lb. TRAILER, \$32.**

With platform and stakes; body, 6 ft. 6 in. to 8 ft. long x 3 ft. 6 in. wide; stakes are removable and side boards may be used; above price is with steel tires; with  $1\frac{1}{4}$  in. solid rubber tires, \$38; extra for pneumatic tire channel, \$4; extra for military hub, \$1.50; extra for crank axle, \$1.50.

**CURTIS MODEL A, 1000-lb. TRAILER, \$47.50.**

Has cross springs and sub-frame; body 3 ft. 7 in. wide x 6 ft. long; front end gate removable; rear end gate on hinge; tread 56 in.; weight, 400 lbs.; 34 in. steel tires.

**CURTIS MODEL B, 1000-lb. TRAILER, \$60.**

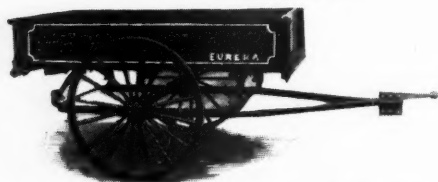
Has 34 in. solid rubber tires; other specifications same as Model A.

**CURTIS MODEL C, 1000-lb. TRAILER, \$90.**

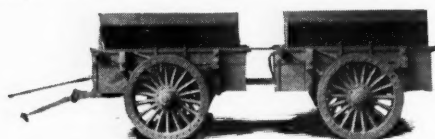
Has artillery wheels; 30x3 in. pneumatic tires and fenders; other specifications same as Model A.

**CURTIS MODEL AA, 1000-lb. TRAILER, \$39.**

Has side springs, body, 6 ft. long x 3 ft. wide.

**Eureka Co., Rock Falls, Ill.****EUREKA No. 1, 800-lb. TRAILER, \$30.**

Weight complete, 370 lbs.; height of loading platform, 26 in.; body, 3 ft. 7 in. wide x 5 ft. 8 in. long.

**Glen Wagon D Car Corp., Cortland, N. Y.****STAR TWIN MODEL T, 10-ton TWIN TRAILER, \$2250.**

Weight of both trailers, 9400 lbs.; steel tires, 8 in. wide; Timken roller bearings; 18x4 in. hand brakes; total length behind towing vehicle, 19 ft.; bottom dumping doors; trailer tracks with towing vehicle.

**GLEN MODEL BB, TRAILER, \$375.**

Height of loading platform, 3 ft. 8 in.; body, 6 ft. wide x 12 ft. long; 6 in. steel tires; 108 in. wheelbase; tread, 56 or 59 in.; trailer tracks with towing vehicle.

**Harper Buggy Co., Columbia City, Ind. HARPER No. 12, 1000-lb. FLAREBOARD, \$50.**

Has plain spindles; speed up to 20 m.p.h.; other specifications same as above;  $1\frac{1}{4}$  in. rubber tires, \$7 extra;  $1\frac{1}{4}$  in. steel tires, \$50 extra;  $1\frac{1}{4}$  in. rubber tires, \$8 extra.

**HARPER No. 10, 1000-lb. FLAREBOARD, \$58.**

Body, 3 ft. 4 in. wide x 6 ft. long x 8 in. high; Timken roller bearings; speed up to 35 m.p.h.;  $1\frac{1}{4}$  in. axles; with  $1\frac{1}{4}$  in. axles, the capacity is 1500 lbs.; tread, 56 in.; weight, 280 to 295 lbs.; patent hitch with universal joint;  $1\frac{1}{4}$  in. steel tires;  $1\frac{1}{4}$  in. rubber tires, \$7 extra;  $1\frac{1}{4}$  in. steel tires, \$1.50 extra;  $1\frac{1}{4}$  in. rubber tires, \$10 extra.

**Lally Commercial Body Co., Everett, Mass.****LALLY 5-ton LUMBER TRAILER**

Body equipped with three rolls for discharging load, one operated by lever and ratchet; wheels, 60 in. diameter;  $3\frac{1}{2}$  in. axle.

**LALLY No. 104, 15-PASSENGER BUS TRAILER**

Has Archibald wheels, 60 in. diameter with solid rubber dual tires;  $3\frac{1}{2}$  in. axle; seat cushions, 6 in. deep.

**LALLY No. 123, 5-ton LOW DOWN TRAILER**

Has 6x1 in. steel tires, bronze bushings and grease cups; other specifications same as above.

**LALLY 10-ton REACH TRAILER**

Maximum wheelbase, 30 ft.; 44 in. Archibald wheels; steel tires, 10x1 $\frac{1}{4}$  in.; bronze bushed wheels; 4 in. square axle; Reach pole 5x6 in. with bounds front and rear; other specifications same as above.

**LALLY FOUR-WHEEL 4-ton PLATFORM BODY**

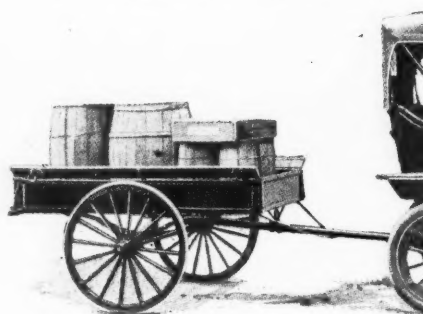
Wheels, 4 ft. 6 in. diameter; body, 6 ft. 6 in. wide x 14 ft. long, fitted with removable stakes and stake boxes; semi-elliptic springs in rear; platform turntable forward part; pole for hauling, 7 ft. long.

**LALLY 4-ton DUMP BODY**

Has elliptic springs front and rear; all steel body and drop bottoms; other specifications same as above.

**LALLY 8-ton TRAILER**

Body, 6 ft. 6 in. wide x 14 ft. long; semi-elliptic springs in rear.

**Lion Buggy Co., Cincinnati, Ohio.****LION 1000-lb. FLAREBOARD, \$57.50.**

Weight, 250 lbs.; body, 3 ft. 6 in. wide x 6 ft. long; 34x1 $\frac{1}{4}$  in. rubber tires; Timken roller bearing axle; trailer tracks with towing vehicle.

**D. A. Laros & Sons Co., Grinnell, Ia. LAROS 1200-lb. OPEN BOX TRAILER**

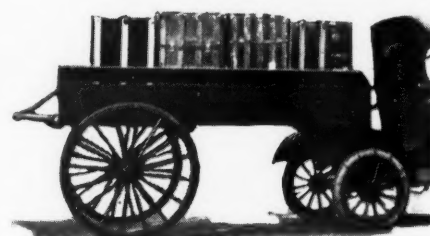
Body, 3 ft. 9 in. wide x 6 ft. long with drop rear end gate and removable front end; sides, 10 in. high; wheels, 32 in. high; steel tires,  $1\frac{1}{4}$  x  $\frac{3}{4}$  in. or  $1\frac{1}{4}$  in. solid rubber;  $1\frac{1}{4}$  in. axle with plain or Empire ball bearings; Bradley hitch; weight crated, 500 lbs.

**Luth Carriage Co., Cincinnati, Ohio.****LUTH TRAILER No. 1, \$40.**

Has  $1\frac{1}{4}$  in. 1000-mile Bell collar dust-proof axle with deep felt oil pads; 34 in. Sarven wheels;  $1\frac{1}{4}$  x  $\frac{3}{4}$  in. steel tires; detachable flareboards; bracket hitch to body of automobile; weight, 350 lbs.

**LUTH TRAILER No. 5, \$66.50.**

With  $1\frac{1}{4}$  in. Ford pattern ball bearing axles;  $1\frac{1}{4}$  in. ring rubber tires; other specifications same as No. 1.

**Martin Rocking Fifth Wheel Co., Springfield, Mass.****MARTIN MODEL A, 1-ton FLAREBOARD, \$160.**

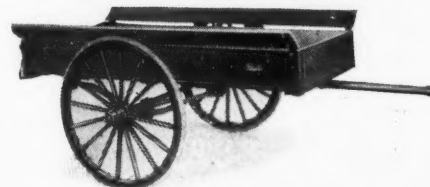
Height of loading platform, 43 in.; body, 3 ft. 6 in. wide by 9 ft. long; solid rubber tires, 45x1 $\frac{1}{4}$  in.; ball and roller bearings; 56 in. tread; platform or semi-elliptic springs.

**MARTIN MODEL B, 1-ton FLAREBOARD, \$160.**

Specifications same as Model A except length of body is 11 ft.

**MARTIN MODEL C, 1-ton FLAREBOARD, \$160.**

Specifications same as Model A, except length of body is 12 ft.

**Miami Trailer Co., Troy, Ohio.****MIAMI MODEL 1, 1250-lb. TRAILER.**

Timken  $1\frac{1}{4}$  in. roller bearing axle; artillery wheels, 32 in. diameter x  $1\frac{1}{4}$  in. rims;  $1\frac{1}{4}$  in. solid rubber tires; special short-turn gear; semi-elliptic springs; 56 in. tread; load platform height, 26 in.; special shock-absorbing drawbar; wheelbase, 70 in.; weight, 500 lbs.

**MIAMI MODEL 2, 1250-lb. TRAILER**  
Specifications same as Model 1 excepting tires are 30x3 $\frac{1}{2}$  in. pneumatic.**MIAMI MODEL 1A, 1250-lb. TRAILER.**  
Specifications same as Model 1.**MIAMI MODEL 3, TWO-WHEEL 800-lb. FLAREBOARD.**

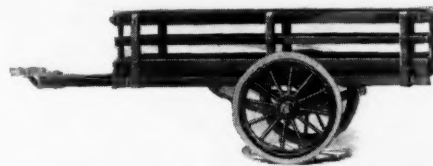
Wheels, 36 in. diameter; weight, 300 lbs.; other specifications same as Model 1.





**MIAMI MODEL 4, 600-lb. TRAILER.**  
Axles, 1½ in. coach; plain taper bearings; 36 in. artillery type wheels; weight, 290 lbs.; other specifications same as Model 1.

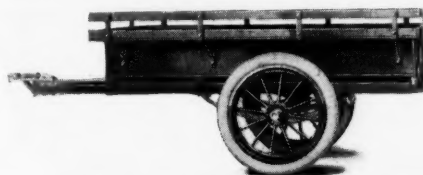
**Ohio Traller Co., Cleveland, Ohio.**



**OHIO MODEL 50, 1500-lb. SLAT SIDE,**  
\$100.

Shock absorbing drawbar; semi-elliptic springs; 1½ in. square axle; 56 in. tread; roller bearings; artillery wheels; solid rubber tires, 32x2 in. (or pneumatic tires, 34x4 in. at \$8 extra); weight crated, 550 lbs.; loading space 8 ft. long; other lengths of loading space—6 ft., \$95; 10 ft., \$110; 12 ft., \$120.

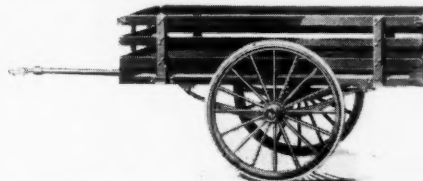
**OHIO MODEL 51, 1500-lb. TRAILER, \$95.**  
With 6 ft. loading platform—with 8 ft., \$100; 10 ft. \$110; 12 ft., \$120; other specifications same as Model 50.



**OHIO MODEL 52, 1500-lb. TRAILER, \$115.**  
With 8 ft. loading platform—6 ft., \$105; 10 ft., \$130; 12 ft., \$145; other specifications same as Model 50.

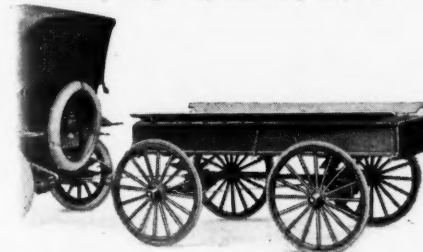


**OHIO MODEL 11, 800-lb. TRAILER, \$35.**  
Square axle, 1½ in.; box bearings; 34 in. wheels; round edge steel tires, 1¼x5-16 in.; weight crated, 375 lbs.; other specifications same as Model 50.



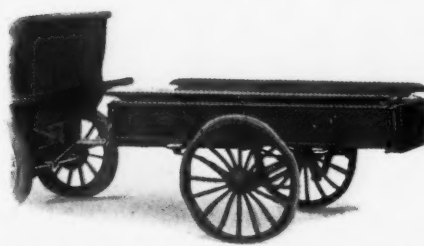
**OHIO MODEL 20, 800-lb. TRAILER, \$45.**  
Specifications same as Model 11.

**Parry Mfg. Co., Indianapolis, Ind.**



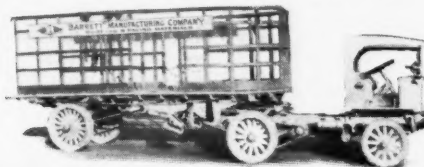
**PARRY MODEL 300, 1200-lb. FLARE-BOARD.**

Weight, 600 lbs.; height of loading platform, 25 in.; body, 3 ft. 9 in. wide x 8 ft. long; 1¼ in. solid rubber tires; tread, 56 or 62 in.; triple Hayes Springs front and rear; special gear with short turn construction.



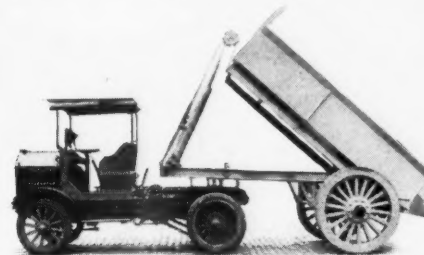
**PARRY MODEL 301, 800-lb. TRAILER.**  
Weight, 450 lbs.; body, 3 ft. 4 in. wide by 7 ft. long; 1¼ in. solid rubber tires; tread, 56 or 62 in.; platform type springs.

**Jacob Press Sons, Chicago, Ill.**

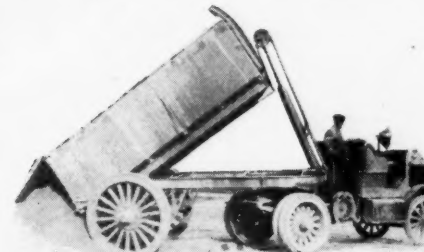


**PRESS 10-ton SLAT SIDE SEMI-TRAILER.**

Suitable for roofing and paving materials. This is fitted with jacks and the tractor is fitted with Press oscillating fifth wheel, the load being carried by a separate set of springs over the tractor springs.

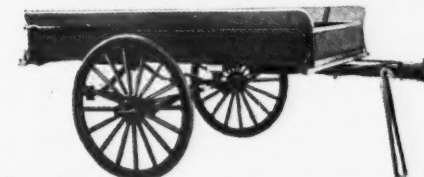


**PRESS 8-ton DUMPING TRAILER.**  
Wheels of artillery type fitted with locomotive steel tires; pivot base hoist.



**PRESS 8-ton DUMPING TRAILER.**  
Shows trailer in midst of dumping load. Specifications similar to other 8-ton Dumping Trailer.

**H. C. Randolph, Jonesville, Mich.**



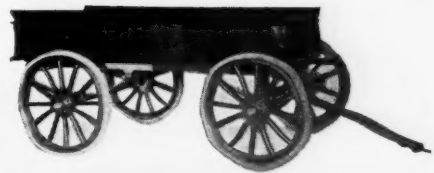
**RANDOLPH MODELS 11, 12, 13 AND 14 TRAILERS, \$40 UP.**

Capacity 1000 lbs. to 1 ton; weight, 350 lbs.; ¾ platform springs; friction or roller bearings.

**Sechler & Co., Cincinnati, Ohio.**

**TRAILMOBILE, 1500-lb. TRAILER, \$179.**  
Weight, 530 lbs.; height of loading platform, 29 in.; body, 3 ft. 4 in. wide x 7 ft. 6 in. long; 2 in. tires front and rear; 62 in. wheelbase; 56 or 60 in. tread; semi-elliptic springs front and rear.

**TRAILMOBILE 1-ton TRAILER, \$209.**  
Weight, 570 lbs.; body length, 7 ft. 11 in. and 8 ft. 4 in.; 2½ in. tires front, 2½ in. rear; 62 in. wheelbase; other specifications same as 1500-lb. Model.



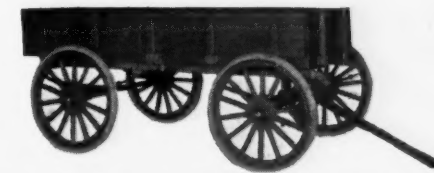
**TRAILMOBILE MODEL 1, TRAILER, \$208.**



**TRAILMOBILE MODEL 2, COVERED TRAILER, \$235.**



**TRAILMOBILE MODEL 6, SCREEN SIDE,**  
\$300.



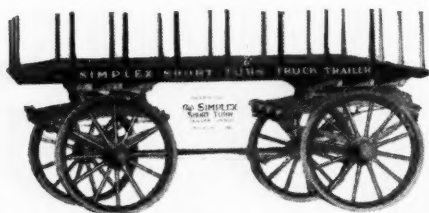
**TRAILMOBILE MODEL 52, BOX BODY,**  
\$210.



**TRAILMOBILE MODEL 53, TRAILER,**  
\$235.



**TRAILMOBILE MODEL 100, TRAILER**  
\$275.

**Simplex Short-Turn Trailer Co., Anderson, Ind.****SIMPLEX MODEL G, 2 1/2-ton STAKE, CHASSIS \$750.**

Weight, 2200 lbs.; tires 36x4 front and rear; wheelbase, 96 in.; other specifications same as Model H.

**SIMPLEX MODEL F, 1 1/2-ton TRAILER, CHASSIS, \$550.**

Weight, 1250 lbs.; body length, 10 ft.; tires, 36x3 in.; wheelbase, 90 in.; other specifications same as Model H.

**SIMPLEX MODEL E, 1-ton TRAILER, \$250.**

Weight complete, 850 lbs.; height of load platform, 32 in.; body, 3 ft. 4 in. wide x 9 ft. long; tires 32x2 in. front and rear; wheelbase, 84 in.; other specifications same as Model H.

**SIMPLEX MODEL B, 1200-lb. TRAILER \$115.**

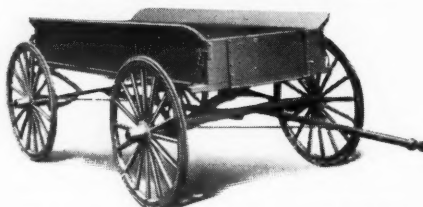
Weight complete, 600 lbs.; height of loading platform, 28 in.; body, 3 ft. 4 in. x 7 ft.; 30x1 1/4 in. rubber tires; wheelbase, 61 in.; other specifications same as Model H.

**SIMPLEX MODEL H, 5-ton TRAILER, CHASSIS \$1250.**

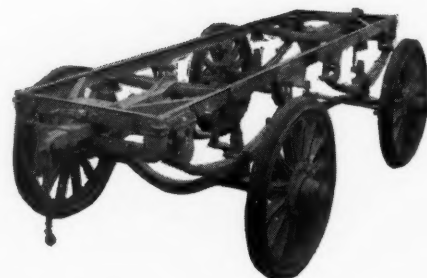
Weight, 3750 lbs.; artillery wheels; Bower roller bearings; height of loading platform, 36 in.; body, 3 ft. 6 in. wide x 12 ft. long; Duo tires, 36x3 1/2 in. front and rear; 61 in. wheelbase; 56 or 60 in. tread; trailer tracks with towing vehicle.

**SIMPLEX MODEL A, 1200-lb. TRAILER, \$155.**

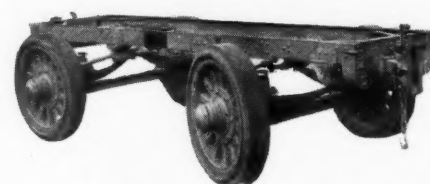
Weight complete, 600 lbs.; pneumatic tires, 30x3 in.; other specifications same as Model B.

**Troy Wagon Works Co., Troy, Ohio.****TROY MODEL 58, 1250-lb. TRAILER.**

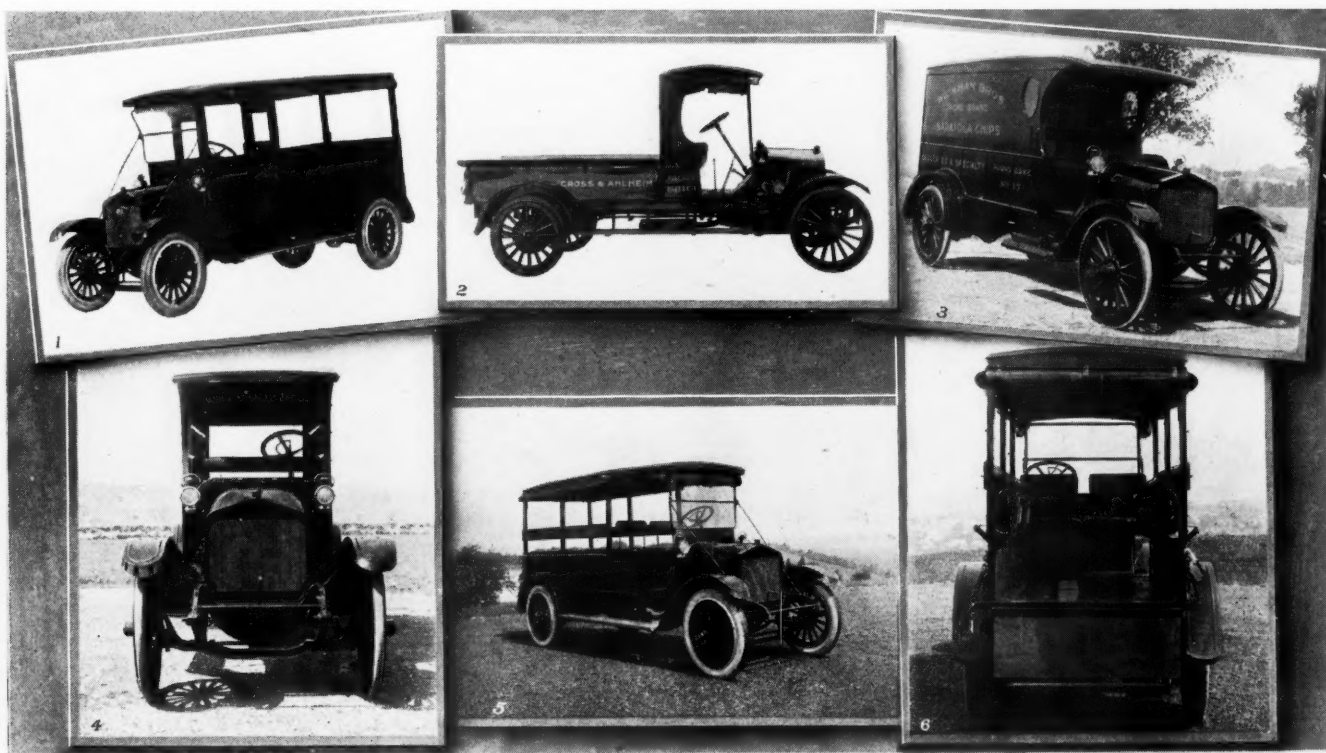
Tread, 56 in.; wheelbase, 70 in.; wheels, 36 in. diameter; solid rubber tires, 1 1/4 in.; Sarven hubs; Timken roller bearings; 1 1/4 in. square axle; height of loading platform, 26 in.; body, 2 ft. 11 in. wide x 8 ft. long x 10 in. deep, 6 in. flareboard; full cushioned spring drawbar; weight, 500 lbs.

**TROY MODEL 212, 2 1/2-ton TRAILER.**

Body allowance, 1200 lbs.; tread, 63 1/2 in.; frame length, 11 ft. 10 in. x 3 ft. 5 1/2 in. wide; height of frame from ground, 3 ft. 1 1/2 in.; 3x3/4 in. steel tires or 4 in. rubber tires; 36 in. artillery type wheels, S.A.E. standard; Bower roller bearings; weight, 2300 lbs. with 4 in. steel tires or 2565 lbs. with rubber tires.

**TROY MODEL 512, 5-ton TRAILER.**

Body allowance, 1500 lbs.; tread, 64 5/8 in.; frame length, 11 ft. 10 in. x 3 ft. 5 1/2 in. wide; height of frame from ground, 3 ft. 1 1/2 in.; tires, 4x1 in. steel, 7x1 in. steel or 7 in. solid rubber; 36 in. artillery type wheels, S.A.E. standard; Bower roller bearings; weight, 3490 to 3950 lbs., depending on tire equipment.

**Chase Trucks in Various Delivery Lines**

1. A fifteen hundred pound car fitted with semi-panel top body with roof and side curtains, windshield and engine starter. Used by a Syracuse hardware concern and running an average of fifty miles per day. 2. Same chassis with open express body and cab over driver's seat. Used by a commission house, for delivery of butter and eggs. Runs sixty miles per day; sixteen miles per gallon of gasoline. 3. Has enclosed panel top. Owned and operated by a company making Saratoga chips and other grocery supplies, in Scranton, Pa. Runs sixty-five miles per day and has replaced three one-horse wagons. 4 and 5. Same chassis fitted with combination passenger and freight body. 6. Same truck with seats upturned allowing for use for freight. Owned by Ocansey Store in Accra, on the Gold Coast of West Africa. Used for conveying passengers and their packages from the chain of stores to their far distant homes, at a minimum charge.

The CCJ has most advertisers because it gives them biggest returns



# Experiences of a Large Paving Concern With Trucks

## With Details of the Operating and Accounting Systems

By C. B. MONTGOMERY



**F**OR four years past, the Union Paving Co., of Philadelphia, Pa., have been large users of motor trucks for the moving of asphalt, stone and other paving materials. This company has done considerable experimenting in that time and in return for its enormous expenditures, feels that it understands quite well the possibilities and weaknesses of motor trucks and have devised a very thorough method for keeping records of the same. The following article tells what this company from experience believes is the best method of conducting and supervising a commercial car installation.

The subject may best be treated in two branches, first the Mechanical or Operating side, then the Office or Accounting side.

### Mechanical or Operating Side

First come the selection of the proper make, size and style of body. There will, of course, be no attempt made to discuss the merits of various manufacturer's trucks. Each buyer must investigate and decide this problem for himself. It is best however, to standardize on one or two makes so that parts are interchangeable and expensive delays may be avoided. Chassis weights vary greatly and we prefer the lighter machines, provided strength and ruggedness are not sacrificed too far.

If the hauling problem is one where the quantity of material to be moved is so large as to require several trips of even the largest unit then theoretically, greatest economy is effected by using the largest truck obtainable.

If, on the other hand, many small loads must be moved or if a load must be distributed in small portions over a large area, it would be folly to use a large and expensive truck which would run light a large part of the time.

The word "theoretically" in connection with the large units, was used advisedly. While manufacturers can produce trucks of twenty tons capacity or over, the first cost and upkeep are so enormous and mechanical troubles so frequent that these very large trucks, although obtainable, are undesirable.

This company's experience has been that under existing conditions a five-ton load is large enough. Exception to this may be made in the case of tractor-trailers which will be spoken of later.

In the asphalt business we consider that best results will be obtained from the use of two size units; five tons for heavy hauling in large quantities and two tons for moving tools, workmen and light loads of material.

The type of body will, of course, depend on the nature of the material to be hauled. For asphalt, coal, building materials, etc., a single shell steel body is preferable. This should be built as wide and low as practicable, rather than narrow and high.

This keeps the center of gravity of the load low, thus reducing vibration and makes the truck easier to load from the street.

In the case of a dump truck, the body must be perfectly smooth inside, sides should be straight rather than flared outward and body should be several inches wider at the back than front. These features facilitate rapid dumping.

### Evils of Overloading and Overspeeding

A common tendency among truck users, particularly those "new at the business" is to load trucks beyond their capacity. This like most evil practices, shows no harmful results for a long time, but, nevertheless, does an injury to the machine and ultimately collects a toll in repair bills and tires far beyond the first saving.

Practically the same may be said of overspeeding. Some makes of trucks are capable of a greater safe speed than others. A truck to be profitable should make a minimum of five m.p.h., except on the steepest grades, while a maximum on good, unobstructed roads may be fourteen to sixteen miles. We make an average running speed under all conditions of seven or eight m.p.h.

### A Street Foreman Promotes Efficiency

If three or more trucks are in use, it will be profitable to have a foreman at the point to which the trucks are running to see that no time is lost in unloading or in running between points; to locate mechanical trouble, make immediate repairs, if slight or if serious report same to shop foreman by telephone. All such reports of trouble or recommended adjustments should be confirmed in writing. The street foreman should also make a daily report for the office which will be mentioned under "Accounting."

### Repairs and Replacements

One of the largest and most indeterminate factors in connection with truck maintenance is the purchase and installation of repair parts. Most parts must be purchased from the truck manufacturer, thus precluding competition and often resulting in prices 20 to 100 per cent. more than a legitimate cost of manufacturing and retailing. If repair work is done at the manufacturer's shop or service station, a labor charge of \$.60 to \$.80 per hour is added when experienced mechanics may be employed for half that amount. We, therefore, have our own garage, machine shop and a force of mechanics where a great many of our needed parts are made, fitted and installed. Castings, chassis frame members, crankcases and other complicated parts which we cannot easily make are purchased before needed and kept on hand for emergency. This, together with the fact that all parts are interchangeable, reduces our idle time to a minimum.

### Wood vs. Metal Wheels

We have experimented with both metal and wood wheels and in future will always specify metal wheels on the large trucks. Wood wheels soon work loose under the strain and jars of traffic with the result that the wheel must be taken off, sent to a woodworker and either tightened up or rebuilt. This takes from two to ten days and costs from \$10 to \$40 (approximately).

The mileage received from tires is perhaps 20 per cent. lower with wood wheels than those of steel or iron. Owing to the frequency of our wheel and tire troubles, we keep three spare wheels in the shop, one front and two rear. When such troubles occur, we can jack up the truck and exchange wheels in much less time than would be required to run to a tire agency and wait for the change to be made.

### Tires

In the item of tire expense, we find widely different results from different makes, thus making it advisable for every user to try several makes and to watch closely the results obtained, both as to mileage received and frequency of replacing. The manner of keeping these tire accounts will be spoken of under "Accounting."

### Cost Records

Every truck user probably realizes the necessity for some record of costs and work performed. The question usually is, "How much detail do I need?" or "What is the best and simplest record to keep?"

Efficient trucking requires that certain cardinal principles be followed, but these must be adapted to the particular needs of the business where they are to be applied and to the number of trucks in use.

In this article the writer will attempt to show first these cardinal principles or essential rules and then show how they have been adapted to our individual requirements, namely the delivery of paving materials.

The functions of a cost or record system may be stated as follows:

(1) To show the total operating cost in terms of one or more predetermined units, as; cost per day, per mile, per ton, per ton-mile, per stop, etc.

(2) To analyze these total costs into their various items for purposes of comparison and locating "leaks" or inefficiencies.

(3) To make a subdivision of expenses against the proper work or jobs in proper amounts.

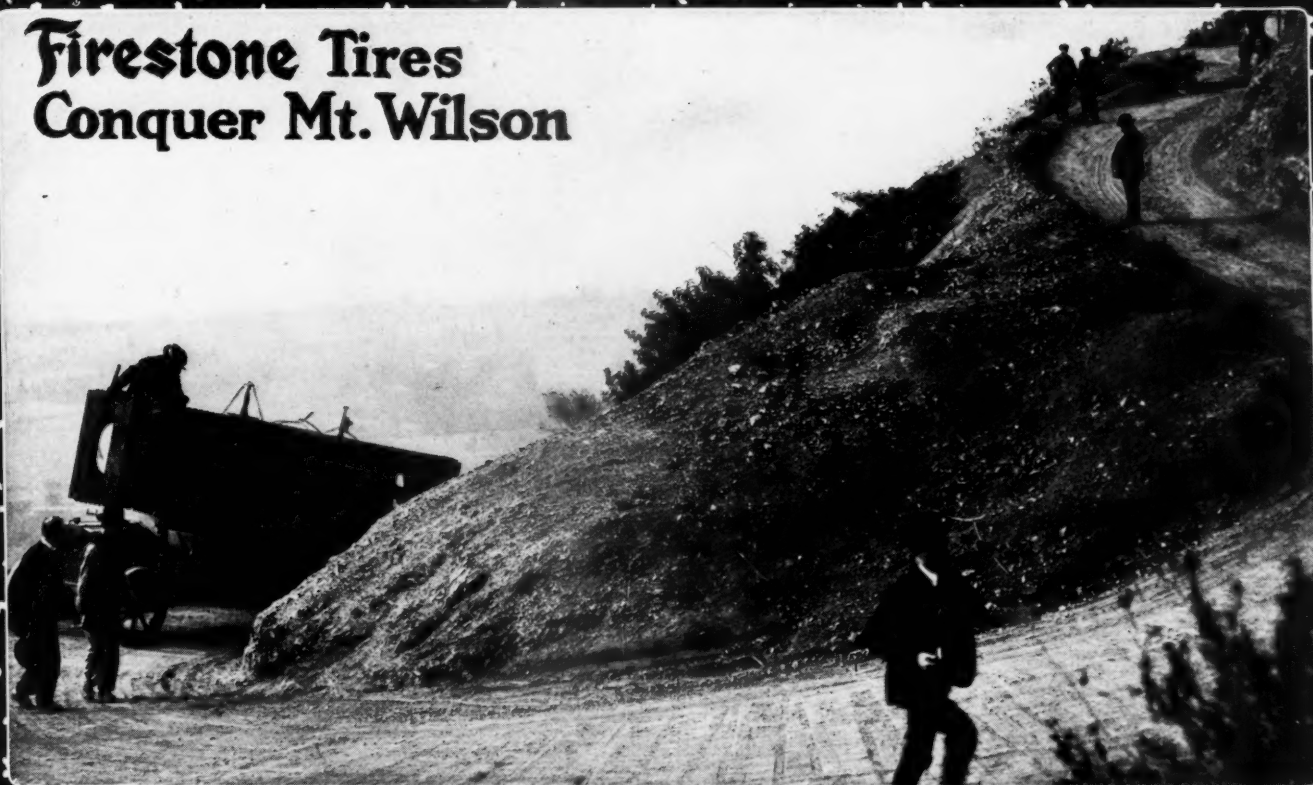
### Determining the Cost Unit

Costs should be expressed in some term or unit which represents most clearly a definite amount of work performed. Hence the day or hour as a cost unit is inadequate. The cost per ton is meaningless unless the distance traveled is constant and known, while the cost per mile would convey no

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## Firestone Tires Conquer Mt. Wilson



*Pulling 13 Tons of Steel Up a Nine-mile Mountain Trail—Using the World's  
Toughest Tires to Build the World's Largest Telescope*

## —And Finish 100 Per Cent Good!

Almost without a scratch Firestone Tires came out of this tremendous trial! Nine miles of zig-zag climbing over a rocky trail where precipitous cliffs made skidding a fatal possibility. But the Firestones didn't skid.

### Weight on Back Tires

The strain of the overhang was terrific—4 tons on the rear. In many places the weight of truck and girder (16½ tons) rested wholly on rear tires—and all

made worse by the gritty grind of granite.

Send for illustrated folder with details of this interesting test. It proves how ordinary work is easy for Firestone equipment.

**Firestone Trailer Tires**—Extra tough and strong, all styles and sizes.

### Firestone Tire and Rubber Company

*"America's Largest Exclusive Tire and Rim Makers"*

Akron, Ohio — Branches and Dealers Everywhere

# Firestone

the net amount paid for new tires purchased, including the original equipment and credited with the amount charged into truck operating. The balance will show the value of unused tires.

### Depreciation

This is perhaps the most intricate item in cost keeping and is frequently handled in an unscientific and slipshod manner.

Since the truck user with only a small fleet would hardly be justified in going into this subject as deeply as the owner with a great many expensive trucks, the writer will outline two methods, first one of comparative simplicity and then one more complex, but more thorough and accurate for persons with large fleets.

The practice advocated by some accountants of increasing the rate of depreciation as the equipment ages, is not recommended. The amount of depreciation charged against the performance of a given quantity of work should be the same whether that work is performed during the first or any subsequent year. The cost of tires must be deducted from the first cost, since tires are charged as a separate item. Deduction must also be made of the probable scrap value of the truck at the end of its useful life.

**First Method.**—It may safely be assumed that a truck's value would be greatly reduced after the lapse of a few years even though the truck stood idle the entire time. In other words, a part of the purchase price depreciates independently of the mechanical condition of the car. This amount must be arbitrarily chosen, 15 per cent. of the cost less tires being a fair proportion. This amount should be divided and charged in uniform amounts per month or per year whether the truck be idle or working. The remainder of the purchase price should be divided by the estimated number of miles the truck will travel and charged against truck operation at this price per mile.

**Second Method.**—The far-sighted truck owner will often spend large sums of money in replacing parts of his truck as they wear or break. These replacements prolong the life of his equipment to such an extent that the first method would result in having the entire value charged off when the truck was still fit for considerably further service. The purchase of these expensive parts would also cause his repair expense to fluctuate in an irregular and meaningless way.

To overcome these difficulties, a list should be made, proportioning the purchase price over the many parts, such as chassis frame cross-members, crankcase, pistons, cylinders, radiator, transmission, axles, body, etc., etc. Any parts valued at less than \$10 may be ignored.

Then, when any one of these listed articles is renewed, the depreciation account should be debited with the list price (not the actual purchase price) of the replaced part, since it may be considered that the value of the truck is enhanced by that amount. If, when renewing, it is necessary to pay more than the original proportionate value of that part, the excess should be charged into the repair account.

**Repair Expense.**—As intimated above, there is a close relationship between Re-

pair Expense and Depreciation. This may best be illustrated by a concrete example.

Assume a new truck to be purchased January 1, 1916, for \$4500. Deduct value of tires, approximately \$300 leaves \$4200. The owner estimates that the truck will run fifty months or 45,000 miles and that he will then be able to sell it for \$500. He therefore charges his truck operating under the item of depreciation, with \$13 per month, working or idle, plus \$.0614 per mile run, and credits depreciation account with these amounts. Then, if his preliminary estimates were exactly correct, depreciation account would balance when the truck's life ended.

Suppose, on the other hand, that after running two years, some expensive part, as a crankcase, breaks and requires replacing. He purchases a new crankcase, pays \$250 and pays mechanics \$50 for installing same. Both this material and labor are charged into repairs (debit side). By consulting the list of values of the various parts on his new truck, he finds that his original crankcase was valued at \$215.50, let us say. Then he has added \$215.50 to the value of his truck, which sum is added to the debit side of depreciation account and subtracted from debit side of repair expense.

These transactions would not affect the regular charge of \$.0614 per mile for depreciation.

Repair expense should be charged into operating expense at a uniform rate per mile. This rate must be estimated at first and then compared with the actual expense as the truck ages. From three to six cents per mile should be approximately the cost of repairs (excepting replacements mentioned above) throughout the life of the truck.

### Bonus System for Drivers

After a truck has been selected, purchased and put into operation, the extent of its efficiency depends very largely on the driver. Upon his ability and discretion rest almost every item entering into truck costs.

Hence, if it is possible to stimulate the driver's ambition; to cause him to take a sincere, personal interest in his work, the result is an increase in the amount of work done and a reduction in upkeep costs. This has long been recognized and some system of rewarding drivers for extra work, etc., has frequently been tried, but usually with doubtful success. This has been on account of faults in the method of rewarding rather than because the principle was unsound. The conditions upon which a bonus is paid should be carefully thought out. It would not do to offer unqualifiedly a prize for all work above a certain amount, since drivers would "race" their cars and the equipment would suffer. Neither is the plan of rewarding the best kept and neatest looking car, in itself commendable as appearance alone does not deliver material.

We have worked out a method of paying bonuses which is nearly "fool-proof" and which has shown an absolute increase in efficiency of about 9 per cent. The bonus is based on the miles per gallon of gasoline and on the miles run per day, taking into consideration the distance to job and

the hours worked. During July, 1915, copies of the following notice were placed in each employee's pay envelope:

Beginning with August 1st, this company proposes to operate its motor trucks upon a profit-sharing basis.

All drivers, mechanics, etc., are to participate in any savings shown in the cost of operation in proportion to the extent you are responsible for this saving.

Each employee is urged to do his best to increase the efficiency of this department and the company will, in turn, reward this effort by dividing equally any saving below our average previous costs.

Settlement will be made about the 15th of each month for the previous month's work.

You can increase your share of the profits by particular attention to the following details:

1st. By reducing the idle time of the trucks. (Each minute a truck stands idle costs from \$.03 to \$.05.)

2nd. By handling your truck in a careful, sensible manner. (A motor truck is a delicate and expensive machine and requires skilful and judicious care.)

3rd. By reducing your consumption of gasoline where possible.

4th. By increasing your mileage per day without overspeeding. (A truck should never be operated over 10 to 12 m.p.h.)

5th. By selecting the shortest good road to your destination.

This system was followed through August, September and October, during which time careful records were kept on each truck. The averages for an entire fleet of fourteen trucks for these three months is shown below. To make an accurate comparison, the averages for two months before and two months after this experimental period are shown and the percentage of improvement is based on these combined averages.

	June and July	Aug., Sept. and Oct.*	Nov. and Dec.	Percentage of Improvement
Miles per day	35.8	42.9	42.8	9.2%
Miles per gal. of gas—				
	2.22	2.45	2.3	8.4%

\*Bonus period.

The amount of bonus to be paid can be readily determined. The gallons of gasoline to run a given distance may be closely estimated. If less than the estimated amount is used, the difference times the price per gallon has been saved.

A table should be drawn up showing the required miles for a day's work at various distances, based on past experience if possible. If a driver succeeds in running over this estimated mileage he has effected a saving of the fixed operating cost times the excess miles run.

It is advisable to distribute amongst the drivers about 40 per cent. of the apparent savings, leaving the balance as a margin of safety against errors in accounting, etc.

### Fixed and Variable Costs

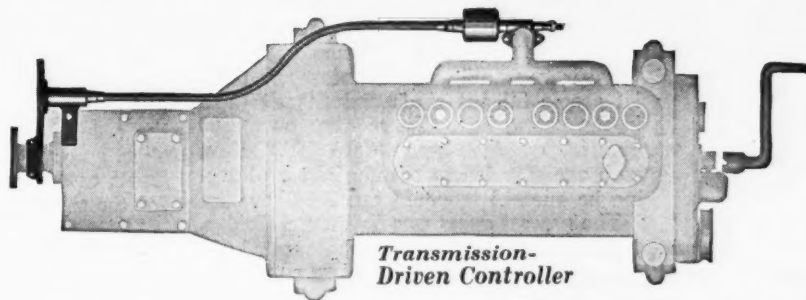
Occasionally, when a truck is idle, due to no work, it might be used elsewhere, providing the cost were not too great. Or, when renting out a truck to be used under



# PIERCE



## The World's Most Famous Speed Controllers



*Transmission-Driven Controller*

Go where you will, talk with whom you please, investigate in any place and you will find that the most extensively used, most popular and most efficient speed-controlling devices are those of Pierce manufacture.

Engine builders, truck makers and users of commercial cars combine in lauding Pierce devices and back up their praise by using them on their engines and trucks.

We offer you three types—one attached to any exposed rotating part of the engine, another that's transmission-driven and a third that operates from the front wheel. One of these types should be on each of your trucks.

## PIERCE GOVERNOR COMPANY

Anderson, Indiana, U. S. A.

*Originators of Speed-Controlling Devices for Gasoline Cars*  
THE WORLD'S LARGEST GOVERNOR BUILDERS

conditions different than his own, a truck owner is often at a loss to know just how to charge for his machine.

In these cases, as well as in figuring bonuses as mentioned above, it is desirable to know what part of the cost goes on whether a truck is working or idle and what part is directly proportional to the miles run.

Fixed charges consist of: A portion of depreciation (mentioned above), interest, garage charge, insurance, license, truck foreman and driver if he is paid "straight time."

Variable charges include gasoline, oil and grease, tires, repairs, part of depreciation and driver, if he is on an hourly basis.

### A Typical Truck Statement

Below is shown a carefully compiled report of truck operation and expense. These averages represent normal conditions and are based on several years' experience and observation.

Assumed: A new 5-ton dump truck of any well-known make, complete cost, \$4500. Depreciation based on four and one half years and 40,000 miles. Scrap value, \$500. Tires \$275 per set, guaranteed for 7000 miles. Possible working days per year, 250.

Average miles per day (with haul of 5 miles one way) ..... 50 miles  
Average miles per gal. of gasoline.. 3.0 "  
Average miles per gal. of lubricating oil ..... 30.0 "  
Percentage of time lost for repairs.. 20.0

#### Expenses.

Fixed—		per day per mile
Depreciation .....		\$ .563
Insurance (liability, fire, etc.) .....		.580
License fee .....		.100
Truck foreman (supervising three trucks) .....		1.500
Driver .....		3.000
		<hr/> \$5.743
Variable—		
Depreciation .....		\$.0773
Gasoline at \$.25 gal. ....		.0835
Lubricating oil at \$.35 gal. ....		.0119
Tires (on guarantee basis) ..		.0393
Repairs .....		.0600
		<hr/>
Total variable .....		\$.2720
Total fixed .....		.1147
		<hr/>
Total per day .....		\$.3867
		<hr/>
		\$19.34



**Specially Designed Mack Truck to Haul Bales of Cotton**

A specially designed truck of large capacity, to haul bales of cotton in Bombay, India, has recently started on its 8,400 mile journey to the Far East from the Mack factory at Allentown. These trucks are made by the International Motor Company, of New York City.

## Novel Selling Campaign Gives New Agency a Flying Start

By FRANK REED



WHEN Don Lee, California Cadillac distributor, took on the GMC line of trucks this year one of the first things the organization did was to start a selling campaign that had some zip and bang to it. They got up a stunt of a mileage test run which was announced prominently in newspapers all over southern California. The idea was to fill up a 50-gallon tank on the truck with gasoline and see how far it would carry the machine before it was used up. A 1 1/4-ton truck was selected for this stunt. It was given a capacity load and sent through all the principal towns and cities of southern California over the boulevard to San Bernardino, Riverside and Redlands, then through the rough roads and grades of Santa Ana pass to Orange county cities and so on back to Los Angeles. Every little while the truck would stop and the drivers would give out information and let people fill out cards and deposit them in the voting box. There were over 2000 guesses, ranging from 46 to 1200 miles, with one silly fellow putting in a card saying he guessed it would run 201,000 miles.

The nearest guess was by Damon Cooley, the San Bernardino agent, who guessed 601 miles, while the actual run-down count was 600.9 miles. Cooley was not given the prize on account of his connection with the company but it was awarded to T. W. Curl, of the Tropico Feed and Fuel Co., Tropico, Cal., who guessed 601.2 miles.

This run got a great deal of local publicity in every town, not only printed matter in the local newspapers but talk and gossip. The run was made over typical conditions encountered by a truck in commercial activities, covering 450 miles of boulevard, the balance over oil roads and gravel, taking level and hilly as they come, plenty of both kinds in the run. The idea was not to pile up the greatest possible mileage record but to show the public a consistent record under normal operating conditions.

Analysis of the prospect's business as a preliminary to affecting a sale is a very im-

portant part of the Don Lee program. D. H. Jaques, sales manager of the GMC trucks in the Don Lee organization discussing this point with the correspondent of COMMERCIAL CAR JOURNAL, said, "Yes, that is the way I have to sell them all. We have to show people how to use the trucks and fit them to their business. The old-time idea of buying a truck for advertising or something like that has evaporated. The only way to make a sale now is to convince the man that your truck is as good or better than the other, and then fit it to his special kind of business. In doing this we have to see that we know all the conditions and that we are going to satisfy every fellow who will come in contact with the truck when it is in operation. We start in with the man on the wagon, and work with him and then up from him, educating them all as we go along. No, there is no more buying for advertising."

On service the Don Lee organization does little talking. Two standards adhered to in the service matter are to treat people all alike, and not to give anybody any adjustments or concessions he ought not to have for the sake of getting more business.

### Price the Last Consideration

Sales Manager Jaques considers that price has nothing to do with the choice of a line as far as they are concerned. The fact that every member of the organization believes there is no better truck made, and price is the last thing they mention to a prospect, is where they get their business.

"Is it necessary to talk against horse costs?" was the next question which struck fire. "Yes, it is," was the vigorous reply. "You can put it down straight that trucks have not driven out the horse absolutely in a lot of lines. This is especially true in house to house delivery, so we have to know horse conditions and horse costs and how we can beat them."

"Prospects are genuinely good in the truck business. There has never been more interest than now," says Manager Jaques, who has been selling GMC trucks to the big people in southern California for several years, "and it looks as though 1916 would be a whaling big year."

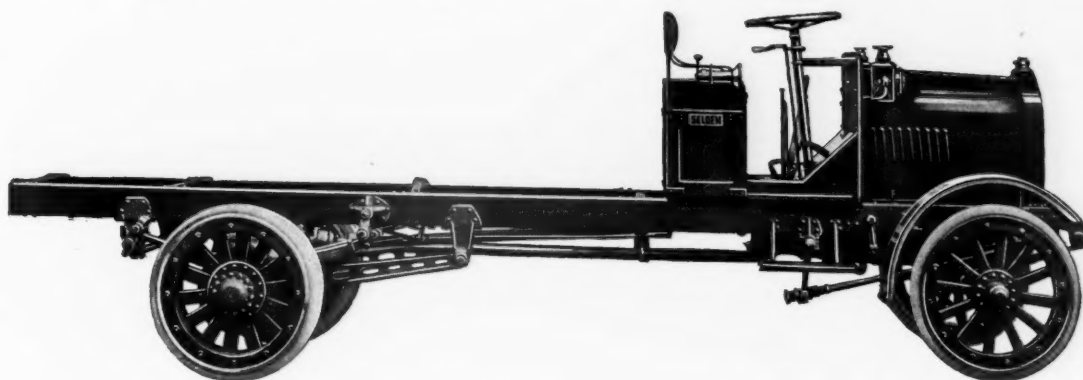
Usefulness of a truck to the other fellow is the foundation of every sale this organization makes. Their policy is to search out the man who needs trucks, find out how a truck would help him, and then make him see it. They work the outside territory through sub-agents and salesmen. In appointing sub-agents they give preference to men running an implement business or machine shop, or some other business which will bring them naturally in contact with truck prospects and give them a business which will help carry the overhead and even up the income, as truck sales are liable to come in bunches and then run for quite a time with no business until the next sale is put over.





# The SELDEN Line

## offers great profit possibilities



### Four Fast Selling Models

Dealers, if you want to take on a line whose quality, service and adaptability will cause it to sell well—investigate the Selden.

Here is a line of four good sellers—every one a tried and proven truck that has earned a great reputation because of what it does and the way it does it.

These four models are a  $1\frac{1}{4}$  worm drive at \$1700, a 2 ton worm drive at \$2250, a  $3\frac{1}{2}$  ton worm drive at \$2950 and a 2 ton internal-gear drive at \$2000.

Each of these models is built in accordance with the high standard that has made the

Selden a popular truck at home and abroad. The four comprise a line that enables you to offer a practical and economical solution for every hauling problem.

Selden name, Selden construction, Selden performance will all help you to make many sales. In addition thereto, we offer you intelligent co-operation in securing orders and back you up with prompt deliveries and good service.

Furthermore, our special deferred payment plan will help you close many a sale that might otherwise be lost.

Big opportunities await aggressive dealers in the Selden line. You can make the agency a source of great profit to you. Write for our special sales plan and learn how easily Selden trucks are sold.

## Selden Truck Sales Co., Rochester, N. Y.

# Selling Used Motor Trucks So They Stay Sold

By LEN G. SHAW



**F**OR obvious reasons, the used truck problem is becoming more of a factor each year in the automobile industry. With the seasoned user it is a case of off with the old and on with the new just as soon as there come evidences of material wear, which means that there are left on the market used cars in which there is still much service—cars that are too valuable to “scrap,” and which must be turned over at a profit as quickly as possible.

A. B. Flint, who sells used motor trucks for the Thompson Auto Co., Federal dealers in Detroit, Mich., is a veteran in the business, although still young in years. He was for a long time buyer of second-hand cars for one of the biggest concerns in the country, and has figured prominently in New York City, Philadelphia, Chicago and elsewhere. If there has ever been a complaint regarding a used truck he sold, it has not reached Mr. Flint's ears. The reason for this? That was what I was curious to discover.

“How does it come that the used trucks you sell always give satisfaction?” I asked Mr. Flint.

“Well, I wouldn't state the case quite that way,” he corrected, with a smile. “I am not sure that they have always given satisfaction—but I never hear any complaint. The reason for that is simple—I have never, to my knowledge, misrepresented a second-hand truck to a purchaser.

“When a man comes in for a used truck I show him what we have, and tell him frankly the condition of each machine. I have had fellows look at me as though they thought I must be out of my head—but when they bought trucks they found them to be exactly as represented, and unless they were too dense to understand anything they realized that I had given them a square deal in the matter of advance information. It is better in the long run to sell fewer machines in this manner, if necessary, than to misrepresent matters and dispose of more trucks—for there's no harder knocker in the world than a dissatisfied truck owner.

“There are several reasons why we are in a position to give a purchaser of a used car more for his money than he would get some places.

“First of all, every new truck that leaves our establishment was sold at the list price—not a penny less. Prospects sometimes complain at this, declaring they can do better with another dealer—get a 10 or a 15 per cent. discount from list. But it has been our policy to stand pat.

“As a result of taking our legitimate profits on a new sale, we are in a position to charge a man a fair price for a used car, instead of having to make up on that what we sacrificed through cutting the list on the new one. He gets the second-hand car for what it actually is worth, plus a reasonable profit to the seller.”

“Do you give a guarantee on a used car?”

“Never. In the first place, the value of a guarantee is problematical. In the second place, on a used car it might be the cause of serious complications. I always take the ground that if the truck was of my manufacture I would not hesitate to guarantee it—but that I could hardly be expected to guarantee somebody else's product. And invariably the prospect sees the fairness of that position. He is told exactly what he is buying—and he has a pretty good idea of any chances he may be taking.

“If it is a \$50 truck I tell him so—that he will get just what he pays for. If it is a \$500 machine he gets just that much. We figure this is the only way to do business—treat everybody alike, regardless of who they may be.”

“While it may be all right as a general proposition, aren't there times when it results in driving away a sale you might otherwise have made?”

“There may be such cases, but they are so rare that they are not noticeable. Let me tell you an experience in support of this.

“Only the other day a man with whom we had been working for some time came in and wanted immediate delivery on a truck. The only thing we had on the floor was our regular demonstrator, and as a matter of accommodation I offered him that.

“‘All right,’ he agreed, ‘but that is a used car. It has been run. You ought to let me have it for less.’

“‘Not a dollar less,’ I told him. ‘That truck is just as good to-day as it ever was

—better, even, because it has been worked down. You can take it at list price, or wait three weeks for another. We'll be glad to do whatever you say.’

“He hemmed and hawed a bit, but finally decided he would take the demonstrator—at list price. Now, that man knows he got a square deal.

“That's the policy I have always advocated in the sale of used trucks—one price and all the facts.

“The fellows often laugh at me because of the small deposits I take on a truck. I've gone as low as \$1, and \$5 or \$10 is common. Recently a man looking for a used truck came in. We had what he wanted, so he deposited \$1, with the understanding that he was to close the deal in full by 5 that night. He was back before 2 o'clock with the money.

“If I had turned him down on his tender of \$1 as security, demanding a larger deposit, I might have lost the sale. As it was, I was fully protected, because the deposit was forfeitable—it is always with that understanding. It wasn't the money put down that interested me, but the principle of the thing. And the man, feeling that he was being treated white, probably strained a point to make good.

“I have never lost out on a deposit, however small it might be, because the man who is sufficiently interested to put up money means business.

“Selling used trucks presents some funny problems. But it all comes back to the question of a square deal to all concerned.”

## MAINE DEALERS' TAGS ONLY FOR DEMONSTRATING

Automobile dealers of Maine have received letters stating that according to the motor vehicle law the fee of \$25 they pay as dealers covers the purpose of demonstrating cars, for sale and exchange, and that under the interpretation of the law by the last two attorneys general of Maine, a dealer has no authority to use the dealers' registration plates while carrying passengers for hire, or while engaging in any other occupation than that of demonstrating cars for sale. This is felt by the dealers to be an injustice and they will try to have the law repealed or modified.



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